GROUNDWATER QUALITY

(101-66)

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

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GROUNDWATER QUALITY

WEDNESDAY, APRIL 25, 1990

U.S. House of Representatives,
Subcommittee on Water Resources,
Committee on Public Works and Transportation,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:14 a.m. in room 2167, Rayburn House Office Building, Hon. Henry J. Nowak [chairman of the subcommittee] presiding.

Mr. Nowak. Good morning. The subcommittee will come to order. This morning the Subcommittee on Water Resources meets to receive testimony concerning issues of groundwater quality. The testimony we will receive is from the U.S. Environmental Protection Agency, the U.S. Geological Survey, the U.S. Department of Agriculture and the Tennessee Valley Authority.

In addition, testimony will be received from State and other interest groups. The subcommittee last held hearings on groundwater quality issues in July, 1987. Today's hearing is designed to provide updated information to the subcommittee concerning the activities of Federal, State and local governments in the area of groundwater quality.

No single piece of legislation serves to protect groundwater exclusively. The U.S. Environmental Protection Agency protects the drinking water quality of groundwater through several environmental laws but they overlap in part, leading to some duplication of effort. They are not comprehensive, even when administered to complement individual State protective efforts.

The EPA has attempted to integrate the administration of Federal and State laws by issuing a comprehensive national groundwater protection strategy. The groundwater issues facing Congress include whether groundwater contamination is being monitored and evaluated specifically, and whether Federal involvement in groundwater protection should be strengthened.

Groundwater monitoring is performed primarily by the United States Geological Survey. The Survey is the principal source of scientific and technical expertise in the earth sciences within the Federal Government. The Department of Agriculture participates in issues surrounding groundwater quality, because agriculture is a major consumer of groundwater resources.

In addition, increased levels of nitrogen, herbicides, pesticides, have been found in groundwater supplies. Agricultural programs must be developed which are responsive to the needs of agriculture and the preservation of groundwater quality.

The Tennessee Valley Authority will testify regarding its activities relating to groundwater protection.

Groundwater is one of our greatest natural resources and probably the least understood by the public. Located underground, and usually within 2,500 feet of the surface, groundwater reservoirs or aquifers contain about 400 times the volume of the Nation's annual consumption of water, and are the primary water source of half the population or nearly 117 million people.

Groundwater cleanup efforts can be prohibitively expensive. Many of the millions of dollars which have been spent in the Superfund program have been for cleanup of groundwater resources. Groundwater contamination can also be responsible for many indirect costs, including decreased agricultural production and human health affects.

In today's hearing, we will review the status of our Nation's groundwater quality since the committee last acted. The Federal, State and other witnesses should provide a good overview of all the groundwater programs.

Mr. NOWAK. Before we begin testimony I yield to my distinguished colleague from Minnesota, the ranking Republican member of the committee, Arlan Stangeland, for whatever opening statement he might wish to make.

Mr. STANGELAND. Thank you, Mr. Chairman.

I have a statement by John Paul Hammerschmidt that I would like to have made part of the record at this point.

Mr. NOWAK. Without objection, so ordered.

[Mr. Hammerschmidt's prepared statement follows:]

STATEMENT OF HON. JOHN PAUL HAMMERSCHMIDT

Thank you, Mr. Chairman.

Today, our committee turns once again to a review of groundwater quality protection at the State and Federal levels of government.

The quality of our Nation's groundwater continues to be of great importance to many of our constituents and, in fact, to the health of the Nation as a whole. Currently, groundwater supplies nearly one-half of the Nation's drinking water. In rural areas, such as in most of my home State of Arkansas, this percentage is much higher. In addition, groundwater supplies are essential in meeting important irrigation and livestock needs.

In the last Congress, we received testimony on water resources research activities of the Federal Government from the Environmental Protection Agency and the U.S. Geological Survey. This information aided us in understanding more about groundwater pollution problems and allowed us to develop a commonsense consensus on advancing groundwater protection through research, education, and cooperation. That consensus was in the form of the groundwater research bill, H.R. 791, which was reported out by five different committees of the House and passed overwhelmingly on the floor. Unfortunately, action in the other body was delayed until the final days of the previous Congress. As a consequence, final passage of a bill was not achieved.

Today, we would like to obtain the latest information on groundwater protection programs at the Federal level as well as knowledge about current State and local activities in the area.

At this point, while I would again support a research bill along the lines of the bill passed last Congress, I do not believe that new Federal regulation of groundwater is needed. Rather I think it important that current programs be upgraded, research be coordinated, and deference be given to State and locality planning in this area.

Mr. Chairman, I would like to give special thanks to my colleague from Minnesota, Mr. Stangeland, for his particular attention to this issue, and the action he has taken in introducing several bills addressing nonregulatory ways in which to improve the quality of the Nation's groundwater. In particular, his "Sustainable Agriculture and Clean Water Act of 1990," H.R. 4509, deserves the careful consideration of the subcommittee and the Congress as a whole.

Mr. Chairman, I look forward to hearing today's testimony and to working with you and the other members of the subcommittee on this important issue.

Mr. STANGELAND. I will summarize my statement. It is rather lengthy, and I ask that the entire statement be made a part of the record.

Mr. NOWAK. Without objection.

Mr. STANGELAND. Thank you, Mr. Chairman.

Today the subcommittee receives valuable testimony on groundwater pollution—the extent of the problem and the range of solutions. Groundwater is 50 times greater in volume than all surface water at any given time and provides 50 percent of the Nation's drinking water, over 95 percent in rural areas.

In my own State of Minnesota we are highly dependent on groundwater. About two of every three Minnesotans use it, and it is a high quality source of drinking water. But while reliance on groundwater has increased greatly over the years, so has its contamination. There are differing levels of contamination, however. Perhaps in this hearing we can get a better sense on the problem. I don't believe we want to signal a crisis when there really is not one. We also do not want to overreact by setting up a whole new regime of Federal regulation and control.

Already at least 16 Federal statutes and 22 Federal agencies address groundwater quantity and quality. In the last Congress we witnessed a flurry of legislative activities on groundwater, and came very close to enacting a comprehensive research and coordination bill. The consensus emerged that Federal, State and local water managers lacked adequate data.

Mr. Chairman, the same holds true today. The debate continues in this Congress, both in the context of the comprehensive groundwater research bill, and the 1990 Farm Bill, currently in the Agriculture Committee.

Since it knows no boundaries, groundwater cuts across Federal, State, and State governmental jurisdictions, including Congressional committees. Any comprehensive groundwater bill will involve many players and Congressional committees.

On that note, Mr. Chairman, I would like to briefly describe a bill I introduced in April, which is jointly referred to both the Public Works and Agriculture Committees. H.R. 4509, the Sustainable Agriculture and Clean Water Act of 1990, includes several provisions addressing groundwater. It has already become a part of the Farm Bill debate since it addresses key issues involving pesticides, fertilizers, non-point source pollution, and best management practices.

Most important for this committee, at least, the bill would amend several sections of the Clean Water Act. First, it would add groundwater protection as another stated goal of the Clean Water Act. This is to recognize the strong link between surface and groundwater and increase the Nation's groundwater resource protection efforts.

One of the groundwater initiatives of mine involves underground storage tanks. H.R. 4577 establishes a modest loan guarantee and grant program for small owners and operators of leaking or potentially leaking underground petroleum storage tanks.

Finally, Mr. Chairman, I would like to welcome Patricia Jensen of Minnesota's Legislative Water Commission. Her testimony on Minnesota's recent groundwater laws should prove invaluable. For all these reasons, today's testimony will be extremely helpful. Witnesses from EPA, U.S. Geological Survey and the Department of Agriculture will provide information on their programs.

All should help in our efforts on this committee, whether in the context of freestanding legislation, the Clean Water Act, or Superfund reauthorization, and for the Agriculture Committee in the context of the 1990 Farm Bill.

Thank you very much, Mr. Chairman, and I believe our colleague Mr. Upton has a very brief statement he would like to make at this time.

[Mr. Stangeland's prepared statement follows:]

STATEMENT OF HON. ARLAN STANGELAND

Thank you, Mr. Chairman. Today, the subcommittee receives valuable testimony on ground water contamination—the extent of the problem and the range of solutions. Ground water protection will continue to be one of the most important environmental issues throughout the 1990's. This will certainly be the case not only in our committee but also in the Agriculture Committee and other committees that deal with ground water.

When the Public Works Committee wrote the Clean Water Act in 1972, surface water quality was the primary focus and concern. While this emphasis continues today, we are turning increasing amounts of attention to another resource—the unseen resource called ground water.

Ground water is 50 times greater in volume than all surface water at a given time and provides 50 percent of the Nation's drinking water—over 95 percent in rural areas. My own State, Minnesota, is highly dependent on ground water. About two of every three Minnesotans use it as a high-quality source of drinking water.

But while reliance on ground water has increased greatly over the years, so has its contamination. There are differing levels of contamination, however. Perhaps through this hearing we can get a better handle on the severity of the problem. We don't want to signal a crisis when there really isn't one.

We also don't want to overreact by setting up a whole new Federal regime of regulation and control. Already, at least 16 Federal statutes and 22 Federal agencies address ground water quality and quantity. These laws and programs then supplement countless State and local requirements.

Last Congress, we witnessed a flurry of legislative activities on ground water and came very close to enacting a comprehensive research and coordination bill. A consensus emerged that Federal, State, and local water managers lacked adequate data. There was also a perceived need for better coordination and consistency among Federal, State, and local programs. Mr. Chairman, the same holds true for today. The debate continues this Congress both in the context of a comprehensive ground water research bill and a 1990 farm bill currently in the Agriculture Committee.

Throughout this debate, we must keep some important principles in mind. First, ground water is a unique environmental resource which requires different approaches to prevention, control, and cleanup. We should not address the issue by unearthing a whole new environmental statute.

Second, ground water legislation should improve upon the current inconsistency and lack of coordination among the Federal programs. Third, and perhaps most important, States and local governments must retain primary responsibility for managing the resource, since ground water protection issues are generally defined by local parameters and conditions.

Since it "knows no boundaries," ground water cuts across countless Federal and State governmental jurisdictions, including congressional committees. Any comprehensive ground water bill will involve many players and congressional committees.

On that note, Mr. Chairman, let me describe a bill I introduced in April that is jointly referred to both the Public Works and Agriculture Committees. H.R. 4509, the Sustainable Agriculture and Clean Water Act of 1990, includes several provisions addressing ground water. It has already become part of the farm bill debate, since it addresses key issues involving pesticides, fertilizers, nonpoint source pollution, and best management practices.

It encourages sustainable agricultural practices; expands the Conservation Reserve Program to include wetlands, filter strips, and other critical areas; and establishes programs on soil testing and nutrient management education. This latter program would specifically include demonstrations on the use of artificial or constructed wetlands to dispose of and treat rinsates and stormwaters from nutrient dealer sites.

And most importantly, for this committee at least, the bill would amend several sections of the Clean Water Act. First, it would add ground water protection as another stated goal of the Clean Water Act. This is to recognize the strong link between surface and ground water and increase the Nation's ground water research and protection efforts.

It is not meant, however, to trigger the same type of Federal response to ground water quality that currently exists for surface water quality; Federal Regulatory controls such as NPDES permits would clearly be inappropriate and intrusive on State and local prerogatives. Nor is the provision meant to extend the current nondegradation goal for surface waters to ground waters—at least at the national level. This should be left to each State to decide.

The bill also reauthorizes the act's important provisions on nonpoint source pollution (section 319), rural clean water (section 208), and clean lakes (section 314). All of these can help prevent and respond to ground water contamination. In particular, H.R. 4509 would remove the $7.5 million cap on ground water protection grants under section 319(i) and reauthorize the grant authority for another 4 years.

One other ground water initiative of mine involves underground storage tanks. H.R. 4577 establishes a modest loan guarantee and grant program for small owners and operators of leaking or potentially leaking underground petroleum storage tanks. This limited financial assistance would help small businesses meet ground water protection requirements while at the same time continuing to stay in business and provide essential community service.

Finally, Mr. Chairman, let me welcome Patricia Jensen of Minnesota's legislative water commission. Her testimony on Minnesota's recent ground water law should prove invaluable. The Negotiations on, provisions in, and implementation of the new State law can teach us something at the Federal level. Minnesota is addressing many of the same issues we must face, such as increased education and funding, agricultural chemicals, and leaking underground storage tanks.

For all of these reasons, today's testimony will be extremely helpful. Witnesses from EPA, USGS, USDA, and TVA will provide information on their programs. We'll also get perspectives from State officials and key interest groups. All should help in our efforts on this committee—whether in the context of free-standing legislation, the Clean Water committee in the context of the 1990 farm bill.

Thank you.

Mr. NOWAK. The Chair would like to recognize Mr. Upton.

Mr. UPTON. Thank you, Mr. Chairman, and I would like to commend you for calling this hearing to discuss the issue of protecting our Nation's groundwater resources.

Despite considerable progress made in cleaning up many of our Nation's environmental problems, groundwater contamination remains a growing concern. Along with many other degraded resources, we are learning that prevention of groundwater pollution is far less expensive than cleaning up contamination problems after they occur.

In my home State of Michigan, almost half of our drinking water comes from groundwater sources. The Department of Natural Resources has identified more than 1,600 contaminated groundwater sites, including more than 270 sites that provide drinking water for Michigan residents.

In addition, the Department has estimated that it will cost hundreds of millions of dollars and take decades to clean up only a portion of these sites. The scope of our problem is disgraceful. Federal, State, and local governments are going to have to work together and dedicate the necessary resources to address the problem. To fully come to grips with this problem, we need to know the full extent of the problem, and greater coordination of Federal research could help identify the magnitude of this problem and prevent the further contamination of our groundwater resources.

In the future we need to work diligently within our Federal, State and local partnerships to address the problem. Equally importantly, we need to work to make sure new sources of contamination do not continue to threaten the purity of our groundwater resources.

Thank you for calling this hearing, and I hope it will refocus our attention on the urgent need to protect our vulnerable groundwater.

Mr. NOWAK. Thank you for that statement. It puts us in the proper perspective.

Let us turn to our panel for the opening witnesses. From the Environmental Protection Agency, we have Robert H. Wayland III, Deputy Assistant Administrator for Water; from the U.S. Geological Survey, Dr. Dallas L. Peck, who is the Director; from the U.S. Department of Agriculture, Dr. Harry Mussman, who is the Deputy Assistant Secretary for Science and Education; and from the Tennessee Valley Authority, Dr. Roland D. Hauck, who is a soil scientist in the Agricultural Research Branch, of the National Fertilizer and Environmental Research Center.

Gentlemen, welcome, and we will turn to Mr. Wayland for his statement.

TESTIMONY OF ROBERT H. WAYLAND III, DEPUTY ASSISTANT ADMINISTRATOR FOR WATER, ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, DC; DALLAS L. PECK, DIRECTOR, U.S. GEOLOGICAL SURVEY, WASHINGTON, DC, ACCOMPANIED BY PHILLIP COHEN, CHIEF HYDROLOGIST, WATER RESOURCES DIVISION; HARRY MUSSMAN, DEPUTY ASSISTANT SECRETARY, SCIENCE AND EDUCATION, U.S. DEPARTMENT OF AGRICULTURE, WASHINGTON, DC; ROLAND D. HAUCK, SOIL SCIENTIST, AGRICULTURAL RESEARCH BRANCH, NATIONAL FERTILIZER AND ENVIRONMENTAL RESEARCH CENTER, TENNESSEE VALLEY AUTHORITY

Mr. WAYLAND. Thank you very much, Mr. Chairman. EPA is very pleased to have this opportunity this morning to review with you and the committee our activities with respect to the protection of groundwater.

In your opening statement, you referred to the Agency's 1984 strategy. Since Administrator Bill Reilly and Deputy Administrator Hank Habicht have come to the Agency, they have initiated a review of that strategy under the auspices of a task force which Hank Habicht chairs, and in a few moments I would like to talk further about the activities of the task force.

I should note at the outset that that group has formulated a goal for EPA's emerging groundwater policy which is to prevent adverse effects to human health and the environment, and to protect the environmental integrity of the Nation's groundwater resources. The members' opening statements have done a fine job of underscoring the importance of this resource to the country, and I won't dwell on that further.

I would, however, like to observe that groundwater protection is a particularly complex challenge for our agency and for the other Federal agencies represented here today. That is attributable to a number of reasons having to do with the resource itself, as well as the threats to that resource. First and foremost, the concentrations of contaminants released to groundwater often have a very limited opportunity in contrast to the situations we deal with in surface water, to be diluted or mixed with other receiving waters. The absorption of contaminations or transformation of them to different contaminants underground is difficult for us to assess accurately given the current state of scientific knowledge.

In addition, groundwater is quite difficult to manage. In contrast to surface water, where sampling is a relatively simple proposition, with groundwater we have to sink a well, and in many cases the results of the analyses that are performed in one location may not be informative as the condition of the groundwater just a few feet or yards away.

In addition, groundwater contamination is caused by a very wide variety and number of sources, including improperly managed underground storage tanks, hazardous waste landfills, agricultural practices, septic tanks, and many others. From experience, we know that once contaminated, groundwater is very expensive to clean up, and in fact it may not be practical in some instances to undertake that cleanup.

Even with these challenges, however, the Nation has made significant strides in protecting groundwater. EPA, USDA, the Department of Interior and other agencies have gained experience in implementing groundwater related authorities, and we are all undertaking new initiatives in this area.

At the same time, because of the localized nature of groundwater contamination and some of the solutions, we recognize that the States need to exercise a lead responsibility on this issue. The States have been rapidly moving ahead and developing their own groundwater protection strategies, and wellhead protection programs.

I would like to briefly outline some of the overarching EPA initiatives that affect groundwater, then talk about some of our contaminant or source-specific programs.

First of all, EPA has a new emphasis on pollution prevention that should pay dividends with respect to all environmental media, groundwater included. The underlying philosophy there is that the Nation increasingly needs to find ways to avoid generating pollutants in the first place, by product substitution, process modification and otherwise, rather than simply managing those pollutants after they have been generated and become a residuals management problem.

In addition to our emphasis on pollution prevention, we have supported the development of State programs through $40 million in Clean Water Act 106 funds, which have been used by States to develop overall planning frameworks, to undertake consideration of legislative changes, to pursue groundwater classifications, State regulation development, resource assessment, point and non-point source contaminant controls, and public education.

In addition, this year we have made our first grants under the non-point source 319 program, our grant guidance emphasized the importance of considering groundwater effects as well as surface water effects, and we believe that probably 20 to 30 percent of the $40 million Congress appropriated for the non-point source program is going to fund projects which will have groundwater payoffs.

Some 30 States have submitted for EPA approval State wellhead protection programs, as authorized by the Safe Drinking Water Act. The first four of these have been approved, and EPA's regional offices and headquarters are reviewing the remaining submissions.

In addition, the Safe Drinking Water Act is the program through which EPA establishes maximum contaminant limits for pollutants or contaminants that may be found in either surface or groundwater supplies that are delivered to consumers through public water systems.

I think the ranking Republican's legislative initiative and his opening statement recognizes that there is a particularly close connection between agricultural practices and groundwater. That connection has been one that EPA has recognized through the development of a pesticides and groundwater strategy.

In addition to trying to formulate a strategy for trying to deal with that contamination when we find it, like the committee, EPA has been quite concerned to learn more about how prevalent and how significant the contamination is.

With significant cooperation from the agencies represented here today, we have undertaken the first comprehensive survey of the presence of pesticides in groundwater. The last sample in that survey was drawn about two months ago. We analyzed approximately 1,350 samples, or we are in the process of analyzing about that many samples, we have 126 analyzed for both pesticides and their known degradation products.

The results of the survey will be available later this fall. It is a statistically designed survey in which we really are not able to draw conclusions on the basis of exit polls. We really need to look at all the results in order to make assessments.

Recognizing that that survey was a multi-year, multi-million dollar endeavor, the Agency also organized into a pesticides and groundwater data base monitoring reports that have been undertaken by a number of public and private organizations over the past ten years. That data base indicates that some 46 pesticides or degradation products have been found in samples drawn in 26 States, as a result of normal agricultural practices. We also have some results that relate to spills of agricultural chemicals.

In addition to pesticides, the survey and many of the results in the groundwater data base relate to the presence of nitrates in groundwater.

We are particularly pleased this year that we have been able to work closely with the U.S. Department of Agriculture on the President's Water Quality initiative, which I am sure Dr. Mussman will explain in greater detail, and that the Department involved the

Agency closely in the formulation of the Administration's Farm Bill proposal.

Of course, EPA directly implements a number of other pollutant or source specific groundwater protection programs. You earlier alluded to the underground storage tank program, the Resource Conservation and Recovery Act is the authority by which EPA sets stringent standards for the management and operation of hazardous waste handling facilities. The Superfund program is our principal remedial program, and under that program we have work underway at about 83 percent of over 1,100 sites that have been listed or proposed for the national priorities list. In most of those instances, the groundwater pathway is the source of contamination of greatest concern.

Our underground injection control program is also directed to permitting the practice of deep well injection of hazardous waste, which is a management practice which actually accounts for a very substantial portion of the hazardous waste disposed of in the United States.

I would like to spend a few minutes talking a little bit further about the task force the Deputy Administrator Hank Habicht and others in the Agency have formed. As you mentioned, there is not presently a comprehensive groundwater program, but we feel we have a number of tools available under EPA statutes, and the ability to work with States to realize gains in a number of other areas, and the effort of the task forces to understand how best to knit those several authorities and programs together.

As I mentioned as an important starting point the task force has formulated an overall goal, which is to prevent adverse effects to human health and the environment and to protect the environmental integrity of the Nation's groundwater resources. Three principles will form the basis for our pursuit of that goal.

First, that groundwater should be protected to insure that the Nation's currently used and reasonably expected drinking water supplies, public and private, do not present adverse health risks, and are preserved for present and future generations.

Second, that groundwater should be protected to insure that where it is closely linked hydrologically with surface water, that groundwater does not interfere with the attainment of surface water quality standards, and that valuable ecosystems are preserved for future generations.

Third, that our groundwater protection should be achieved through a variety of means, including pollution prevention as well as programs aimed at minimizing and eliminating particular sources of pollutants.

With respect to remediation, and in keeping with our goal of prevention, as well as the costs of technical limitations associated with cleanup, which we mentioned earlier, we believe that remediation activities have to be prioritized to first minimize human exposure to contamination risks, then to restore currently used ~~and~~ reasonably expected sources of drinking water from groundwater to support critical habitats, whenever such restoration is practicable and attainable.

Finally, to assure that both prevention and remediation activities are accomplished, an effective groundwater protection program must link Federal, State, and local activities into a coherent and coordinated plan of action. In that regard, EPA has prepared an issue paper on State and Federal roles. The issue paper builds on an analysis of State programs undertaken at EPA's request by the Urban Institute, which examined 40 State strategies developed between 1986 and 1988, and in-depth case studies of eight States. The report found that many of the State programs are highly innovative, and offer good models for groundwater protection.

One major theme of the State/Federal paper is that States and EPA both recognize that much more needs to be done at the Federal and State levels to insure comprehensive protection of groundwater as a resource. Therefore, EPA is committed to taking a more strategic approach, and to actively assist States in comprehensively protecting the resource.

EPA is not going to relinquish its regulatory role, but we will step up our efforts to build on the State level a framework for coordinating Federal programs. We are considering a number of policy options on how best to realize that, which have been presented in the paper, and have been the subject of substantial discussion between EPA and a wide variety of governmental and private groups over the past several weeks.

We are expecting that the task force will complete its work in June of this year, then will pursue implementation of the policy through a variety of means, and we are expecting that there will be a cross-agency task force that will remain as a standing committee to evaluate our progress in implementing the task force's work.

I would like to provide some very initial comments and reactions on H.R. 4509. First of all, I think Mr. Stangeland should be congratulated again for recognizing the importance of the intersection of agricultural policy and activity and clean water, both surface and groundwater. We understand from discussions with your staff that the intention is not, of course, to apply the full range of surface water control programs which are appropriate to point sources that discharge into the surface water to groundwater, but rather to state an important Congressional intention of seeing that groundwater is adequately protected.

I think we believe that the Clean Water Act is probably not the most appropriate mechanism in all of its particulars to realize that objective. Rather, many of the groundwater sources we have mentioned which are not presently addressed by Federal programs are ones which are similar to, and in fact are the same non-point sources which affect surface water, and need to be addressed in a somewhat different manner than we apply to point sources.

Your recognition of agriculture as an importance source for that potential contamination and non-point source impact is very valuable. We will defer, of course, to USDA for the primary Administration statement on the Farm Bill amendments. At the same time, I should say that we recognize that the Farm Bill can be a very important vehicle for realizing environmental gains in the groundwater area, and in a number of others.

We think it is important that Congress take full advantage of the proposals to the Administration as offered, and shape a Farm Bill which can realize those environmental gains.

I think I will close at this point, Mr. Chairman, and I will be happy to answer any questions at the appropriate time.

Mr. NOWAK. Thank you very much.

We now turn to Dr. Dallas L. Peck.

Mr. PECK. Thank you, Mr. Chairman. It is a pleasure for me to appear before the committee today to discuss the quality of our Nation's groundwater resources. I am accompanied by Mr. Phillip Cohen, who is the Chief Hydrologist and head of our Water Resources Division.

With your permission, I would like to summarize my written testimony and ask that my formal statement be included in the record.

Mr. NOWAK. Without objection, so ordered.

Mr. PECK. I will address briefly what we know about groundwater quality, those USGS programs that contribute to our understanding of groundwater, the role of our new national water quality program, and finally the program directions.

What do we know about groundwater quality? Although we know much about the quantity of groundwater, our knowledge of groundwater quality is far from complete. Any assessment of the extent of groundwater contamination is technically difficult because of the scarcity of wells suitable for water quality sampling and the difficulty in sampling. Despite these constraints we can draw a number of general conclusions about the status of groundwater quality in the United States.

The U.S. has large amounts of potable groundwater available for use. Some groundwater is contaminated by naturally occurring constituents, such as salts, iron, manganese and nitrate, which are released from the soils and rocks. Locally, high concentrations of toxic compounds form plumes associated with point sources, such as underground storage tanks, waste disposal sites, and landfills.

Regions have been identified in which contaminants derived from non-point sources are present in shallow wells. These exceed drinking water standards or health advisories in a small percentage of water samples. Such non-point sources common associated with urban areas, agricultural lands, and septic systems in suburban areas.

The contamination of shallow aquifers by nitrates and synthetic organic chemicals is widespread in many areas. For example, 20 percent of 124,000 wells analyzed by the USGS over the last 25 years had nitrate concentrations sufficient to suggest the influence of human activities. Six percent of the samples exceeded Federal drinking water standards.

As Mr. Wayland mentioned, EPA reports that 46 pesticides have been found in groundwater and one or more pesticides attributable to agricultural use have been detected in the groundwater of 26 States.

As yet, however, most deeper aquifers commonly used for public drinking water supplies are relatively free from contamination. Reports of additional contamination should be expected in the coming years, as monitoring efforts increase, and the intensity of our analytical procedures improves.

The survey carries out a variety of water resources programs. Over the past decade, investigations focusing on groundwater contamination have increased from 50 active projects in progress at any given time to more than 200. A number of programs specifically address some aspect of groundwater quality. The regional aquifer systems program was started in the late 1970s as one of the largest groundwater hydrology programs ever undertaken.

Under the program, the recharge-discharge characteristics of each aquifer system was studied, and the computer simulation model of the groundwater flow developed. Water quality activities under the program generally focused on naturally-occurring and organic compounds.

Nuclear waste hydrology studies were also started in the last 1970s to investigate potential disposal sites for radioactive waste. The toxic substances hydrology program was started in the early 1980s, to address problems associated with toxic waste in the Nation's groundwater and surface water.

The Federal/State cooperative program with State and local agencies maps aquifers, designs and operates water quality monitoring networks, and provides other forms of technical assistance which support groundwater protection efforts. That's a 50-50 cooperative program.

We also carry out groundwater investigation supported by other Federal agencies, such as EPA, DOE, the Department of Defense, the Bureau of Reclamation, and the Army Corps of Engineers.

As far as the National Water Quality Assessment Program, we proposed that program as part of the President's fiscal year 1991 budget now before Congress, following five years of developing and testing the program concept in seven prototype studies. The locations of those studies are shown in Attachment 1 of my written submission.

NAWQA is a set of continuing multi-year investigations of groundwater and surface water resources, which will obtain baseline information on water quality conditions, identify trends in water quality, and describe natural and human factors that cause changes in water quality. When fully implemented in 1995, the program will operate on about a $60 million annual budget and will include 60 study units, the location of these are shown in Attachment 2 of my submission.

We will make every effort to make the data collected under the program nationally consistent, so that the data collected from different study units can be combined and aggregated to address different issues at different geographic scales and identify different trends. We are going to make every effort to make sure that the data collected under the program helps meet the needs of our sister agencies, such as EPA and the Department of Agriculture.

An additional set of studies will address a variety of issues, including the appearance of pesticides in groundwater and surface water, the relation of pesticide occurrence through application rates, farming practices, and other factors, the relative magnitude of point and non-point sources of pollution, effective agriculture best management practices on water quality, regional occurrence of trace elements, and the effect of municipal treatment practices on water quality.

We plan a series of topical reports on national water quality issues, and a summary report every three to five years on the status and trends in water quality.

As far as future program directions, there is much that remains to be done and known about the Nation's groundwater quality. Major technical concerns of public policy implications must be addressed if we are to manage our Nation's water quality effectively. These are determining the relationship of human and aquatic health to the occurrence of organic compounds and pesticides in groundwater and surface water, primarily the responsibility of EPA. Determining the relationship of a variety of land use activities to groundwater quality is an area where the USGS could make a major contribution.

Federal, State and local water management agencies will need additional information, understanding and technical assistance, if they are to protect wellhead areas, designate safe water supplies, develop approved farming practices that will enhance water quality, and dispose safely of our society's waste.

The Survey is committed to helping in these efforts.

I have one final observation relating to Federal interagency coordination. A few weeks ago, the Department of the Interior sponsored a symposium to introduce the other Federal agencies to the concepts of our National Water Quality Assessment Program. Secretary Lujan spoke of fulfilling President Bush's goals of preserving and enhancing water quality. Major topics throughout the symposium were how we could improve communications and coordination of Federal water programs.

Similar discussions with the Department of Agriculture, Dr. Mussman and his staff, on implementation and coordination of the President's water quality initiative, have brought together the same agencies, and led to the establishment of a number of coordinating mechanisms under the Department of Agriculture.

My own experience with the Federal Coordinating Council Committee on Earth Sciences and the Subcommittee on Groundwater suggests that we can continue to make major progress over the next few years in getting agencies with common interests and aims to coordinate and mutually support each other's missions and activities.

That concludes my statement. Mr. Chairman, I would be pleased to respond to any questions at the appropriate time.

Mr. NOWAK. Thank you very much.

We will now turn to Dr. Harry Mussman, who is the Deputy Assistant Secretary for Science and Education, Department of Agriculture.

Mr. MUSSMAN. Thank you, Mr. Chairman and members of the subcommittee.

Along with the individuals who have preceded me here this morning, I too am pleased that we have been invited to participate in the hearing on water quality. We hold the view in the Department that this is an issue that not only is terribly important, but it is one in which there is a great deal of misunderstanding as the true situation—what's going on in the field, and what the Federal agencies are doing to deal with some of the problems.

I think every hearing that we have, every opportunity which occurs in which we can explain the nature of our activities, benefits not only the Federal Government but certainly the public, as they know better what is going on.

Agriculture has to acknowledge that it had a role in participating in the creation of the problem. At the same time, we are not certain the extent to which agriculture is part of that problem. Given the fact that it is not yet defined, we would acknowledge that there is a problem, and that agriculture needs to be part of the solution.

The point I want to make emphatically, however, is that we would like to see environmentally sound practices adopted across agriculture for the purposes of addressing some of the problems that have been identified. At the same time, we need to maintain the profitability and productivity of U.S. agriculture if we want to retain the strength in our agricultural economy that we have enjoyed for so many years.

We believe it is possible to do both, to be economically sound and environmentally sensitive.

Back in 1989, the President announced an initiative, just a little over a year ago, an intention and commitment on his part to protect ground and surface water from contamination. The Congress responded very positively to that initiative, approving close to $300 million to be used by four different agencies to address the issue. Our Secretary at that time made the statement that the success of the President's initiative would depend to a great extent on the willingness on the part of farmers and ranchers to adopt a great variety of voluntary practices that would change the way in which farming was carried out.

Later in 1989, we had the chance to develop proposals for the 1990 Farm Bill. In that debate that has been going on since starting late last fall, and coming in here into the spring, and which some of the committee members have mentioned, the strategy that the Department has advanced includes several things. These all deal with groundwater quality and water quality in general. One is to attempt to change current policies through the Farm Bill mechanism that will introduce a flexibility in the way in which farming is carried out to relieve some of the pressures that have been seen to be a problem in the past.

Changing farm policy through the Farm Bill probably would be the first and most quickly accomplished methodology for dealing with some of the problems.

The second way in which we propose to work on these problems in agriculture contamination is through the development of and movement of practices that are less environmentally impacting into the farm community, to get their adoption, to distribute information widely that would encourage the use of these practices, that will indeed, in our view, make a significant impact on the number of problems that currently exist in the contamination area.

The third part of the strategy, probably the last resort in our view, is the regulatory approach. But the Department will indeed use regulatory measures if it appears to be an absolute necessity.

What are the USDA actions that have been taken that are in the process? We have developed a five-year plan. Some of you may be very familiar with that plan. It has a great deal of detail. It will be updated on an annual basis, and more importantly, it is currently being implemented. The goals of the five-year plan are threefold. One is to determine the precise nature of the relationship between agriculture practices and groundwater. There are still many questions as to how and to what extent agricultural practices do indeed end up affecting groundwater.

The second goal would be to develop and gain the adoption of those agricultural practices to which I referred a moment ago, to introduce technically sound and economically effective agrichemical management that would be much more sensitive to environmental needs, and to indeed protect the groundwater from further contamination.

The final objective, of course, is to work very closely not only with our Federal sister agencies, but clearly with the States where the final responsibility, the major responsibility, lies relative to the safety of groundwater. It is going to be a cooperative effort, and I think we all acknowledge that without that cooperation, it simply won't happen.

As far as details of this plan are concerned, I would highlight three major components. One is the research area in which we have ongoing, and will greatly increase, in the coming budget years, the nature of the research dealing with improved agricultural practices. We will address the question of what extent of involvement agricultural practices have in groundwater contamination. We will be seeking more information on the transport and fate of chemicals as they move through soil and ground structures.

We need to develop better sampling techniques. We need to improve the way in which agrichemicals are stored and disposed of. There are a variety of things in which research is being carried out. I would be remiss if I did not mention that included in this package would be a new emphasis on the sustainable approaches, the ICM, the integrated crop management, which has gotten much attention recently, the use of biocontrols, the introduction of biotechnology methods where appropriate, new tillage methods, and certainly crop management and in a general sense, rotation and so on which would mitigate to a great extent some of the problems.

Leaving research for a moment, I want to address the education and technical assistance component of the overall plan. This is the part in which we actually take the research into the field. We attempt to apply it in the field. As the subcommittee is well aware, we have approximately 3,000 Soil Conservation Service offices, and approximately 3,000 agricultural conservation stabilization service offices that are involved very heavily in this whole process. Add to that some 15,000 cooperative extension personnel who work very closely with the Federal extension program, and we have a rather daunting force available for working with field issues.

The main purpose in the education and technical assistance program is to provide the technical assistance, provide the education and the cost sharing which will encourage the adoption of many of these modified agricultural practices. I think of great significance to this committee is the fact that, as I said a moment ago, the plan is being implemented. The evidence of that is that the eight demonstration sites which have been identified and are currently being put in place and staffed so that they can bring to the surrounding agriculture community knowledge of these new agricultural practices and how effective they can be, and eventually be able to, as part of the demonstration site function, to determine how well those practices have been adopted, and to what extent they have had an impact on the reduction of the contamination of groundwater.

A second part of the technical assistance and education program is the establishment of 37 hydrologic units. These are scattered throughout the country. They are in fact watersheds of varying sizes that have been identified through a consultation practice with States, and other Federal and State agencies. We have determined that these 37 watersheds had significant problems that needed to be addressed. They are indeed being addressed, personnel are on site and each hydrological unit has or will have tailored for it a specific set of approaches designed to reduce the problems that have been identified as warranting this kind of action.

I would hasten to add that in addition to the 37 identified in fiscal year 1990, there will be another 37 identified next year, and before the program is over, and before it is fully in place, there will be some 275 hydrologic units identified and being actively worked on.

In addition to both the demonstration sites and the hydrologic units, we have the agricultural conservation stabilization service, 40 special water quality projects that are over and above those that I mentioned previously. They are very deeply involved in complementary activities that will bring to a great extent the introduction of practices that will be less impacting on the environment, particularly upon the water.

The National Agricultural Library is a participant in this. All of you are familiar with that very important resource for a variety of information. They have established at the Library a water quality information center that is being used by the public, the scientific community and by educators.

The third component of the program is data collection. I will briefly say that wherever we have projects underway, there is incorporated in that plan for implementation of those demonstration sites, etc., a data collection component, and eventually an analysis and evaluation will be forthcoming. We hope to benefit greatly by the generation of such information, and its analysis at a later time.

Finally, within the Department, I need to address one issue. That can be summed up in one word: coordination. We have been criticized repeatedly in the Department for not having effective coordination of the multi-faceted programs within USDA. There are indeed 11 USDA agencies involved in one way or another in water quality activities. As a result, there has been created in the Department a working group on water quality that reports to the Deputy Secretary in which we have representation at the Administrator level of all 11 agencies.

In addition, we have as a policy advisory body to this working group a policy advisory committee that is made up not only of inhouse personnel, but also of personnel from within the Environmental Protection Agency, the U.S. Geological Survey, and from NOAA.

I am pleased to mention that we have been considering this for some time, and simply had not gotten around to it, but this seems to be an ideal opportunity to note that we are planning on taking steps to include the Tennessee Valley Authority and the Corps of Engineers as new additions to that advisory body to help us review the progress of our field program, and to permit the kind of further, broader coordination we believe is desirable in all of our field activities.

We held a meeting, by the way, of this policy advisory group last week, with the original four agency membership. We dealt with what is a very significant issue, that being a strategy for monitoring. Monitoring is something that is of interest, it is basic to the entire scope of water quality programs, and there is a difference of authorities and how individual agencies will address the monitoring question which we think is going to be resolved very nicely through the mechanism of this advisory group and the inter-agency cooperation that it permits.

Finally, I would like to note that we have several publications that are out, some of which I have available here this morning, that attempt to update the interested members of the advocacy groups, the public, the Federal agencies, the Congress, and we will be putting these out on a regular basis for purposes of acquainting the parties that are involved with what is going on.

One very last statement, and that is that interagency cooperation has been talked about—I mentioned it already this morning. At the risk of belaboring the point that has already been made by Bob Wayland and Dallas Peck, I want to comment that I have heard over the 20 years that I have been in Government on and off, of cooperative efforts that sometimes fell short of the mark. It simply did not result in the kind of cooperation everyone thought was necessary.

This is perhaps one of the first times that I have seen the kind of cooperation and commitment to cooperation that is existing in this activity, the groundwater activities between the various Federal agencies that are indeed involved. It has been very exciting for me as a long-time bureaucrat to see the way in which the commitment is evident, the enthusiasm is present, and how there is a genuine feeling that only through full cooperation and sharing of information and working together can we accomplish the task.

In the final analysis, we will accomplish the task. We are here today to assure you that we can do it.

With that, Mr. Chairman, I will conclude, and of course be happy to take questions whenever it is appropriate.

Mr. NOWAK. Thank you very much for your statement.

Let me turn to Dr. Roland Hauck, who is a soil scientist at the Agricultural Research Branch of the National Fertilizer and Environmental Research Center.

Mr. HAUCK. Thank you, Mr. Chairman.

I welcome the opportunity to appear before the Water Resources Subcommittee this morning. I represent the National Fertilizer and Environmental Research Center, which is part of the Tennessee Valley Authority, and which is located at Muscle Shoals, Alabama. The Center has evolved from the initial charge to TVA from the

Congress to develop, demonstrate and transfer fertilizer technology to benefit the Nation in agriculture and national defense.

TVA has been true to this charge for more than 50 years, in developing new products, improved manufacturing processes, and efficient nutrient-related crop production practices.

Through a variety of multi-disciplinary activities at the Research and Development Center, and through its nationwide demonstration and technology programs, TVA has been able to make significant contributions to farmers, farm communities and consumers of farm products.

The technology development and the agronomic research continues to be directed at the efficient use of plant nutrients, because this is one of the keys to profitability and environmental protection. Surface and groundwater protection, energy and natural resource conservation are central to all the activities of the NFERC. The Center is uniquely qualified to complement State and local water quality programs through its established record of cooperative effort with the land grant universities, the agribusiness community, and other public organizations.

This cooperative network in NFERC continues to work toward the maintenance of sustainable U.S. agriculture, and in addition, is able to pursue innovative ways to conserve and use natural resources, and to alleviate environmental stress. Specifically, the major program activities of the NFERC which are directly related to water quality issues can be put into three groups.

First, the nutrient related technology development, regulation, demonstration and transfer. Second, waste minimization, conversion to useful products, and disposal of waste. Third, information, education and technical assistance.

I am going to very briefly summarize some selected topics of these program areas. However, the detailed account of these areas can be found in the written part of the addendum to my testimony, and I request that the written material be put into the record.

Mr. NOWAK. Without objection, so ordered.

Mr. HAUCK. All of the activities we have are directed both to point sources and non-point sources of pollution. A typical project may involve the combined efforts of an agronomist, analytical, inorganic and organic chemists, chemical and civil engineers, economists, librarians, microbiologists, and soil scientists. All of them work together in a matrix managed type of group.

Agricultural research is conducted in-house at the NFERC laboratories and facilities at Muscle Shoals, and conducted cooperatively with the land grant universities. The cooperative projects are planned and executed jointly by personnel from the universities and NFERC. They are supported on a matching fund basis. Very often, a coordinated series of experiments is conducted in several States which address a specific nutrient-related and environmentally sensitive issue, such as perhaps the ability of a cover crop to prevent leeching of nitrate in the fall, winter and early spring, or the evaluation of soil tests for hydrogen.

In NFERC scientists have been able to coordinate regional and national research programs on very clearly defined nutrient-related and environmentally sensitive questions. We would welcome the opportunity to work with the EPA and States in research on some very specific questions on a regional basis, using the Clean Water Act Section 319(h) funds, which I understand can be used by States in order to better define and implement groundwater protection strategies.

Almost all of the chemical, the biochemical and engineering research is directed at the development of economically and environmentally sound products and technologies. Use of a constructed wetlands, for example, is one of the novel approaches to the disposal of contaminated waste waters and fertilizer sites under investigation. Such wetland technology could take contaminated waste water, process it through a constructed wetland, which then would flow into a natural wetland or filter strip on an adjacent farm.

We believe that the agrichemical dealer—there are about 14,000 fertilizer dealers in the United States—we believe that these dealers are a very important avenue to educating farmers on the best use of crop protection chemicals, and plant nutrients. The NFERC staff stands ready to work with industry, with the land grant universities, State governments, and the extension service of the USDA in a comprehensive, coordinated, dealer farmer education program.

One of our important projects is to develop and evaluate improved technical and management practices at fertilizer dealer sites. This will enable the fertilizer dealer to remain in business while at the same time complying with the requirements for environmental protection requirements, thereby assuring the Nation's farmers of having a reliable farming input system.

In conclusion, Mr. Chairman, the National Fertilizer and Environmental Research Center of the Tennessee Valley Authority is dedicated to maintaining a sustainable agriculture. That is, we wish to continue to contribute to the evolution of an agriculture that is both productive and profitable over time, and agriculture that is environmentally sound, politically and socially acceptable, and stewardship minded, that is conserving of natural resources. To this end, we will join with all public and private sector organizations that also have that purpose, and that dedication.

Thank you.

Mr. Nowak. Let me just take off on that last statement you made about the public and private sectors cooperating in bringing into a very complicated area some coordination that everybody—all the witnesses—has talked about. It seems to be improving on the Federal level, working with the States, and the ultimate user, I guess, of these pesticides will be the farmer. I wonder if we are getting a program not only of information, which is fine, but of the ultimate source or reduction of the chemicals that everybody has talked about that are somewhat harmful.

I wonder if there is any—it's a broad question we could discuss for hours—what additional legislative or coordinating authority do you see that could aid you in carrying out an effective groundwater protection program?

Mr. Hauck. I can give an example of how nitrogen fertilizers can be reduced somewhat.

Mr. Nowak. Let me additionally ask this question. Reducing that service product that you are all involved with, how are we selling that, and how is it being used by the actual farmer who is going to make the decision whether to put Product A on, Product B, or Product C on?

Mr. HAUCK. In the case of nitrogen fertilizers, the type of product that is used is very much dependent on the type of crop management system that is being used, and the availability of the nutrient in that particular area. However, the quantity that they can use, and the mix of chemicals they can use often can be reduced through a more judicious use. Most farmers are very conscious of cost. They really want to reduce costs for their farm inputs. However, substituting one type of nutrient for another type of nutrient may not be a complete answer.

When I mentioned that there are particularly clearly defined environmentally sensitive questions that need to be answered, I specifically would like to see research allocated toward answering those questions which the States must have answers for in order to have their regulations.

For example, last Friday I met with the Nitrogen Fertilizer Task Force of the State of Minnesota. That task force was created by the Groundwater Protection Act passed by that State last year. They are considering recommending as part of their best management practices several particular types of fertilizer use, and fertilizer application methods.

They are going to recommend that credits be taken for using animal manures for the nitrogen. It is very easy to put these recommendations down on a piece of paper, but it is much more difficult to determine exactly what these credits will be.

We have been very successful in our research in the last 25 years in increasing the productivity of U.S. agriculture. The type of research we have done has been geared toward increasing that productivity. We have a great deal of knowledge about the use of the off-farm inputs. However, there are some knowledge gaps that can be cleared up within a very few years if we specifically address the questions that States need to have answers for in order for them to write their rules and regulations.

Mr. WAYLAND. Mr. Chairman, may I supplement that, especially with regard to pesticides? Your question was about making a selection among products, how is the farmer guided. I am sure Dr. Mussman will have some comments as well. EPA does have a responsibility under the Pesticides Law to evaluate pest control chemicals, not fertilizers, for their potential impact on human health and the environment.

Because of our concern about health impacts generally, we have a long history of requiring toxicity testing. More recently, we have asked pesticide manufacturers to give us information that will help us understand the leeching potential of pesticides. We have as part of our pesticides and groundwater strategy an option which we were about to exercise recently but other events intervened, to require that pesticides be used only by a trained and certified applicator.

We have recently provided a certification and training module that tries to make sure that farmers have information on what contributes to pesticide impacts on groundwater and how to mitigate those impacts. If we are not successful in avoiding significant contamination through mechanisms such as that, we have the ability to prohibit the use of the pesticide.

Our strategy has an intermediate step, because of the very ability we expect to see due to cropping patterns, soil types, and so forth, a requirement that that withdrawal of use would be exercised only if States do not develop and implement an effective management plan to prevent pesticide contamination from reaching the maximum contaminant limit established under the Safe Drinking Water Act.

So while there are a number of non-regulatory approaches that may be appropriate and that will undoubtedly be pursued by USDA and others, we nevertheless have a responsibility to make a determination about the environmental impact of pesticides and control them where that impact is unacceptable.

Mr. MUSSMAN. The point that the representative of EPA made regarding the use of some of these high-risk pesticides, the need for having certified applicators, is a very important one. It is a requirement of EPA that that be the situation in the field, and in fact, the USDA is a partner in the process of providing the training for certification for the pesticide applicators. Obviously, a very effective mechanism has been worked out.

I said earlier during my testimony that the cooperative extension service, the numbers of people involved, primarily attached to State universities, land grant schools, and so on, is a rather significant number of people, that provides a great deal of opportunity for almost one-on-one, oftentimes very high contact opportunities directly with farmers and producers to advise on what the usage of pesticides should be, how they ought to be modified, if indeed the possibilities exist.

In addition, they are now being given, and have been for some time, and will get more in the future as the research evolves, those people in the extension program, as well as those in the Soil Conservation Service and the Agricultural Conservation Stabilization Services, will have additional information to share directly through their many offices across this country that will permit better familiarity on the part of the producers and farmers on what the options are, what the alternatives are that are available that have been shown to retain the economic attractiveness, still retain the profitability, and at the same time reduce the impact of those practices on agriculture.

From the standpoint of coordination, it is safe to say that through the various meetings, conversations we have had, informally and formally, with EPA and USGS in recent weeks and months, there is no question that not only are we doing that here at the headquarters level, but also in the field, where the county committees have involvement of EPA staff members, USGS personnel wherever they are available, plus the entire spectrum of USDA personnel located working in that vicinity.

All that, in addition to the farmers and those who are responsible for the land.

So the whole concept of coordination, demonstration, sharing of information is a continuous chain that moves right out of the laboratory into the field, and is being adopted as quickly as practicable.

Mr. **Nowak**. When we look at the problem itself, as it is now gathered, in terms of the contamination of our aquifers, could you give us an idea, first, of when we go down 2,500 feet, we are saying we have a relatively minor kind of problem. Anything above that, you have varying degrees of heavier contamination.

When you try to look at the larger aquifers in the country, is there a sustained monitoring effort where we have let that aquifer be used for drinking water—how do we measure, how do we acquire the information on contamination?

Mr. **Peck**. If I may, Mr. Chairman, I would like to ask our chief hydrologist, Philip Cohen, to address that question.

Mr. **Nowak**. Sure.

Mr. **Cohen**. Mr. Chairman, most of the public drinking water from public water supplies is monitored after the water is withdrawn from the well, and during the process in which it is provided to the user. As you indicated, about 50 percent of the consumption of water from public water supplies is groundwater. So a substantial part of that water is monitored in that way.

Monitoring of individual domestic supplies in rural areas is largely a State function, largely driven by State laws, State health agencies, and it varies widely from place to place. With regard to monitoring the quality of the water within the ground, the methods of monitoring are even more diffuse. They range widely, and are not very extensive.

Mr. **Nowak**. I guess the next question is should they be more extensive? Would that give us an information base that would be useful?

Mr. **Cohen**. There are a number of programs underway which seek to broaden information about the quality of the Nation's groundwater. You heard from one of the previous witnesses that an assessment is being made by the EPA of pesticides in drinking water wells. This is a broad statistical approach, and we will be able to make a fairly powerful statistically valid statement on the extent and nature of contaminants, pesticides in water wells used as drinking water supplies.

There are other approaches, one of which Dr. Peck mentioned in his testimony, a proposed national water quality assessment, which the Geological Survey proposes to, on a continual basis, assess many aspects of the question that you posed—the nature and extent of groundwater contamination throughout the United States.

I generally characterize that program as responding to three fairly straightforward, rather critical, questions. A statement, a nationally consistent statement on what the quality of the Nation's groundwater is, how has it been changing in the past, and the reasons therefor. This will then have all sorts of implications regarding national policy and methods of monitoring and protecting the Nation's groundwater.

That is one major effort which is now part of the President's water quality initiative that will be—if the Congress concurs—implemented in an operational manner in fiscal year 1991. It is now before the Congress for implementation on a national basis.

Mr. **Nowak**. Let me turn to Mr. Stangeland for a moment.

Mr. **Stangeland**. I want to follow up on that, Mr. Cohen, because I think from my perspective, you hit the nail right on the head. Where are we coming from? Where were we 20 or 30 years ago? How long back can you test and check and have records for? Where are we today? What is that trend line showing, and where will we be 10, 15 or 20 years from now, unless we do something?

Do we have a ticking time bomb out there? Will your studies show an increase in the contaminants, or will your studies show that the technology for determining contaminants is so much more highly sophisticated today that there are contaminants there now that weren't there 20 years ago?

That's what we need to know. Mr. Wayland, you referred to my legislation. Some of that is defensive (or preventive). Farmers depend on that groundwater. That have no purification system, so it is in their best interests to know what is happening out there, and to know for sure what is causing it, who is causing it, and how severe it is. If we don't do anything, how bad is it going to get? Are we approaching a crisis?

Where are you in your studies, Mr. Cohen, to tell us? Where were we and where will we be?

Mr. **Cohen**. From the perspective of a hydrologist, we in the Geological Survey view it from that perspective, from a national point of view, we don't see a crisis in terms of the aggregate water supply.

On the other hand, scientific literature and the literature available to the public is replete with hundreds if not thousands of individual cases where there is severe water quality contamination. The definition of whether there is a crisis or not depends upon who is on the receiving end of the water supply. From a national point of view, our water is in excellent shape. By and large it is probably getting better, but in groundwater, we are fairly uncertain.

As implied by your question, and as implied by Dr. Peck's comments, advancing technology and increased interest in assessing the quality of the Nation's groundwater will surely lead to observations of more and more contaminants. But that is a far from saying it is either getting better or worse. There is a vast amount of water quality data that has been collected over the past scores of years, many decades, using somewhat inconsistent technology for collecting the data. So it is not the easiest thing in the world to go back retrospectively and look at all these data and try to determine what the trends are.

We are doing that as best we can, and we are setting out to establish a new data base for the future, which will use nationally consistent methodologies for data collection throughout the country. And one has to have a fairly extended period of data collection before you can have some degree of confidence in the trends we are observing. Many of the trends we have reported, and others, may be more artifacts than reality. Changing methodology in a chemical analysis, for example, we have documented many times that the apparent change in quality or the shift in trend may be more the result of changing technology as opposed to the reality in the earth.

These are fairly complex issues that we are collectively trying to address.

Mr. MUSSMAN. I would like to add a comment, an echo in fact, of the comments that Dr. Cohen has made. We share the view that the situation is not a crisis, it is not a time bomb. I think what we are seeing is enough to alert us to the fact that if things were to go unchecked, without any attention being paid to them, that potentially serious public health-type problems could result. At the moment, they are so infrequent in nature, that I don't believe that in general there should be great concern about the drinking water in this country.

The thing I think we need to call attention to is that what we are seeing in groundwater today, even with our imperfect sampling methods and the technologies available to us, probably are the result of practices in agriculture and elsewhere that took place years ago, and is only now being found. If we were able to introduce a complete change in how agricultural chemicals are being used, how spills and so on may be contributing to this other point source and so on, if all of that were to be terminated, and complete prevention of further contamination were to occur, it would probably be a number of years before those contaminants that are currently working their way through that ground structure would indeed enter the water and be detected.

What I am saying here is that no matter how effective a program might be, we may be looking at a time period during which there will not be a an abrupt improvement in the situation. There should not be any worsening, we would hope, but there may not be an abrupt improvement until such time as that system has an opportunity to clean itself out and we have then on top of that the changed practices which should reduce the past impacts that have occurred as a result of practices in agriculture and elsewhere.

I would simply raise that for the subcommittee's recommendation.

Mr. STANGELAND. I will follow that up, because I had a question for Mr. Wayland. What do your studies show is the severity and the extent of groundwater contamination?

Mr. WAYLAND. We are not able to really make a clear statement about that, pending the completion of the analyses of the national survey for which sampling was just completed. In the fall, we expect to be able to do that.

Mr. STANGELAND. This fall?

Mr. WAYLAND. Yes, that's right. We can't characterize the information we have assembled from lots of individual studies as representing a complete or accurate picture nationally of the extent of contamination. I would like to mention, however, in terms of our becoming more knowledgeable about the potential for a problem, that we are greatly increasing the number of standards developed under the drinking water program, and those will shortly include standards for 27 pesticides.

We already have standards for nitrates, and public water suppliers will need to monitor periodically for the presence of those contaminants in their supplies, whether they are surface water supplies or groundwater supplies. That will be some additional information beyond the studies that the Government may undertake about the occurrence of agricultural chemicals, as well as other chemicals in drinking water supplies.

In addition, we have the ability, and we have exercised it, to require pesticide manufacturers to undertake specific field studies of the presence and prevalence of their products in different groundwater regimes. It was on that basis that we were considering restriction of one of the major herbicides to use by restricted applicators. But the manufacturer, for reasons of food safety, chose recently to withdraw major uses from the market.

But we also have the additional ability to require manufacturers of pesticides to undertake field studies, and we intend to exercise that as part of our pesticides and groundwater strategy.

Mr. STANGELAND. Dr. Mussman, do you see an increasing emphasis by our experiment stations in analyzing groundwater in their plots where they are using pesticides and herbicides?

Mr. MUSSMAN. Many of the States have active groundwater and general water quality testing going on. There will undoubtedly be an increase in the interest on the part of experiment stations in knowing whether what they are doing experimentally, introducing some of these new practices that will be adopted in their field work, whether that will have an impact on the groundwater. They will have to have baseline information in order to know whether there has been some change coming about as a result of the changed practices.

I guess we are going to see substantially more testing going on than what we have seen in the past.

Mr. PECK. If I can add to that, we have been working very closely with the Department of Agriculture in the midwest, in the corn and soybean belt, looking particularly at the triazines and atrozines, and their sister compounds, and their abundance in both surface and groundwater. From studies like this, we will get a better understanding of the prevalence of herbicides and pesticides.

Mr. STANGELAND. On any question I ask, please feel free to jump in, any of you. They are not necessarily directed to any one of you, because I think this is—and I want to commend the Chairman—a critical hearing, and the first of a number, I hope, to try to determine problems and solutions.

I don't think we can continue to be perceived as sitting here fiddling here while Rome burns, on the one hand. On the other hand, we have a responsibility to make sure we are doing the best we can and addressing problems.

How many States require licensed pesticides and herbicides applicators? Does every State require that?

Mr. WAYLAND. Yes, that is a requirement under Federal law. As Dr. Mussman said, if the extension service undertakes the training in most instances, the certification has been assumed by the State lead agencies for pesticides in I think all but two States, perhaps only one at this point.

Mr. STANGELAND. Is there any way in which we can somewhat regulate the urban user of pesticides who may be putting on pesticides at a much higher concentration in a small area than the farmer who is applying them over a broad area with a licensed applicator?

Mr. WAYLAND. That's a very good point. We think that both for nutrients and pesticides that the lawn and commercial uses may represent a significant water quality concern. We have not systematically evaluated that problem nationwide. But for example, in EPA's national estuary program in Seattle, in the Puget Sound, where there has been a focused look at the impacts on Puget Sound, home and garden pesticide fertilizer use has been identified as a problem of particular concern.

Again, we have a licensing authority with respect to pesticides, and we have some ability to exercise influence over the users. Our authority is somewhat less direct with respect to fertilizer use, but many States are developing nutrient management plans as part of their non-point source programs, and I think that for a number of critical water bodies, it will be very important that those programs be developed, and be implemented in an effective manner.

Mr. STANGELAND. Mr. Chairman, I have a whole host of questions, but I don't want to monopolize the time. I will yield for now, but I would like to come back and ask more questions after some of the other members have had an opportunity to question the witnesses.

Mr. PECK. If I might comment, as part of our National Quality program, we have been studying the groundwater around Oklahoma City, in what is called the Wellington Aquifer. We found abundant pesticides used by the commercial lawn care companies in the groundwater underneath Oklahoma City. The amount of that decreased with depth under the city.

Mr. NOWAK. Let me take back the time, and go back to Bill Emerson, who is from Missouri.

Mr. EMERSON. Mr. Wayland, would you describe for us what a multi-media prevention oriented approach might be, that you are intending to incorporate in your planning and budgeting systems? First of all, describe multi-media. Is that CBS, or NBC, or what is it?

Mr. WAYLAND. One of our terms of art, one of our shorthands for air, surface, water, groundwater, the pathways of exposure to pollutants and contaminants are environmental media. We think of surface water as an environmental medium. So when we talk about multi-media, we are talking about approaches that affect air, water, land, groundwater—rather than just one of them.

Again, it is the nature of most of our statutes that they have developed a scheme for protection of a particular resource such as the surface water, oceans, and estuaries and air. We are attempting to examine our existing authorities and pull agency resources together that will try to scale up from that surface water specific or groundwater specific point to deal with classes of pollutants on a sectoral basis, or across many media.

One good example, I guess, is lead. Lead is a pollutant of significant concern where we have accomplished a great deal under the Clean Air Act in our unleaded fuels program in terms of reducing the overall emissions of tetraethyl lead.

Nevertheless, we see that there are a number of other exposure pathways and mechanisms. Lead is a relatively common contaminant of drinking water as a result of the water distribution system. Lead is emitted from municipal waste combusters, as a result of combustion of lead acid batteries, and other purposes. We have an agency effort underway to focus on lead, and determine what the best ways are of eliminating human exposure to lead, in a cost-effective manner, looking across all of our statutory authorities.

Again, product substitution is the kind of thing we are looking for, the Congress has banned the use of lead solder in plumbing. By doing that, we have eliminated a significant source of exposure to lead.

Our prevention oriented approach is intended to go back up the pike, if you will, of the traditional industrial sources to look at ways that through process changes or raw material substitution, the initial amount of pollution that is generated can be reduced or made less toxic.

Mr. EMERSON. I have also noted that you are proposing the elimination of mining lead in this country, just cutting it off. That's a very simple solution, just not to have any. Therefore, there is not prospect that it will make any problems for anybody. But in the process, I will remind you that 92 percent of all the lead mined in the United States is mined in my district and it is worth 2,000 jobs to us. I hope that the EPA in its deliberations would take into account the cost in jobs impact.

I agree with your objectives of eliminating lead as a contaminant, but surely there is some alternative, maybe more complex, but some alternative to eliminating the prospect of mining lead in this country.

You also say that you are going to develop regulations and policies, but you don't spell out what they are, that are more broadly going to raise the awareness of industry, local and State governments, grass roots organizations, academia, and the public. I would say, referring back to the first question I asked you, you indicated—and I didn't necessarily understand what you meant by the bureaucratese that you were using with us.

We are the Congress of the United States, and fairly reflective of the people. I would encourage the bureaucracy to use language that not only we in the Congress, but the public at large can understand, and that you consider that as we move to develop these regulations and policies. How some of our constituents may comply with your prospective underground storage tank regulations, they are telling me that they will have to go out of business. I wonder if you are considering the impact on jobs in the manner in which you are going to be implementing your regulations on underground storage tanks?

Mr. WAYLAND. The Agency goes to considerable efforts to try to understand the implications of its regulatory actions on employment and on profitability and total cost to society. We have an obligation under our Federal Executive Order to do that, and the Office of Management and Budget assists in making sure that we understand that obligation.

But beyond that, it is also the case that under a number of EPA statutes, our flexibility is somewhat constrained. It may be constrained by the overall statutory objective, or increasing, the Agency is required to produce regulations by a date certain, or in effect, a fairly severe statutory regulation may go into effect instead.

In the case of underground storage tanks, I think the financial responsibility regulations that you are referring to, I believe were seen by the Congressional sponsors as a way to have the marketplace supplement Federal regulatory action to encourage the replacement of tanks which are aged and may be leaking.

The Agency had a specific tank replacement program phased in over what we expected to be a reasonable time frame. Our ability to phase in the financial responsibility provision was somewhat limited. We have been carefully evaluating the availability and cost of insurance and recognize that it is very expensive. When last I look at the figures, and this is not a program that I am presently responsible for, I think something on the order of 30 to 40 percent of the tank owners potentially subject to the requirement—and it is one that is being phased in by the size of tank, or the number of tanks owned by an enterprise—most of those who attempted to obtain the insurance had been successful in doing so.

Nevertheless, there are a lot of very small operations who face a phase-in of this requirement two or three years from now, for whom compliance immediately would be very difficult.

But the short answer to your question is that we do consider those impacts. A somewhat longer answer is that we are not always able to temper our actions based on that consideration.

Mr. **Emerson**. So in considering the impact, the cost of compliance may or may not be relevant?

Mr. **Wayland**. That's correct, depending on the particular statutory mandate we are adhering to.

Mr. **Emerson**. I just wanted to know where we stood.

On page nine of your testimony, you indicate that you would welcome the views of Congress and other groups and individuals as you continue to formulate groundwater policy. You refer there to task force documents which you have sent to Congressional staff, governors, State government agencies, national organizations and State and local governments, local officials, national business and environmental organizations, and your sister Federal agencies. Is it possible to get a complete set of those documents, as a member of Congress?

Mr. **Wayland**. Absolutely.

Mr. **Emerson**. I would like a complete set of those documents.

Mr. **Wayland**. I would be very happy to provide that to you.

Mr. **Emerson**. I would appreciate it.

Finally, on page 11, you say the EPA groundwater task force will evaluate the comments reviewed on certain documents and complete its work in June of this year. You say that implementing the chosen policy will then be pursued through a variety of means.

June is not far away. We have not passed legislation that we are discussing here today, although H.R. 4509 is on the table. We may or may not pass that. So you are saying you are going to implement the chosen policy through a variety of means.

What means do you have in mind, so that we may be alerted? And does it matter whether we pass a law or not?

Mr. **Wayland**. Certainly any action the Congress might take directed specifically to groundwater will have a significant impact upon the action we might otherwise take. Just observing that there has been consideration, off again, on again, of various groundwater proposals, and that there are groundwater provisions in half a dozen or so of EPA's existing authorities, we have felt that it is important to try to have some integrating principles such that overlaps and inconsistencies do not occur.

There is some degree of flexibility in some of the groundwater provisions we implement. Where we can, we would like to take advantage of that flexibility to harmonize our actions, so that it does not appear that with respect to a particular pollutant, when regulated as a hazardous waste, there is one result, and one regulated as a discharge from a tank. There is a different result.

I think that is the principal objective of the task force, along with trying to explore how we can best develop and take advantage of the expertise and authority already being exercised at the State level.

Among the considerations the task force has weighed is whether or not specific groundwater legislation is needed. That decision will not ultimately be mine. However, at this point, I think there is not an expectation that we will as a result of these considerations propose groundwater legislation. So if the Congress were to legislate, that would very clearly have an impact on our approach. But we also think there is an ability to work within the framework of our existing laws more effectively.

Mr. Emerson. Let me say in conclusion that I am very much in favor of pure, clean groundwater. I don't know anyone who is against it. I raised the questions that I did simply as practical considerations as we consider important legislation, and as you make important regulations. There are a lot of factors that have a tremendous impact in many quarters that should be taken into account.

It is just like clean air. I don't know anybody who is against clean air. The only question is how clean, how soon, and at what cost? We need to inject some of those practical considerations into all of our deliberations.

Thank you.

Mr. Nowak. Congressman Grant from Florida?

Mr. Grant. Thank you, Mr. Chairman.

Mr. Wayland, to what extent have normal agricultural farm practices contaminated our groundwater?

Mr. Wayland. Congressman, I am not able to give you the answer I would like to give you at this juncture, because we have just completed the sampling phase of our first comprehensive survey to try to address that question.

As others have mentioned, and as I have mentioned, there are a number of documented incidents of pesticide contamination of groundwater but they have for the most part been discovered somewhat serendipitously, or we can't characterize the information we have to date, which suggests that there are at least 46 pesticides found in the groundwater of 26 States.

In terms of overall severity and significance of that contamination, I think we are all trying to get a lot smarter about that answer through a variety of means, and I think there will be some very valuable information available before the end of this year.

Mr. Grant. Dr. Mussman, you have been looking at degrees of contamination, you said in your testimony, in 20 States. What about your result?

Mr. **Mussman**. I think the statement makes reference to the fact that we are reviewing information that is being generated through EPA and State agency studies. We feel we can draw a lot of information from that. I think the point that needs to be made here is that although we may be finding contamination, the simple act of finding the contamination does not tell us where that contamination came from.

In the case of the pesticides, clearly there is some sort of cause and effect. Pesticides are in general limited to an agricultural usage. However, where they are found may be determined more on where they happened to be mixed, where they happened to be spilled, where they happened to have been disposed of, rather than perhaps through the normal use in agricultural practices.

In the case of the nitrates, I think there is still a reasonable question to be raised about where those nitrates in the drinking wells, the well water that has been reported, is actually coming from. There are studies out of Iowa, out of Ohio, that indicate that more often than not, there is not a relationship between nitrate findings in well water and cultivated crop land. It is more closely associated with the fact that the well is in a barn yard, or adjacent to a septic tank, and that the well is many, many years old, probably breaking down, and there is leakage.

Mr. **Grant**. Could I interrupt you for just a second? What about the Geological Survey, or TVA? Do either one of your agencies, can you tell us if normal agricultural practices have contaminated groundwater?

Mr. **Peck**. I will ask Mr. Cohen to address that.

Mr. **Cohen**. May I respond to the earlier question?

Mr. **Grant**. I wish you would respond to this one first.

Mr. **Cohen**. Much of the information that is available on a nationwide basis, including much of the information that is available in Florida, is anecdotal. People have conducted studies of individual fields. Or they have been concerned about the quality of water in an individual well, and they have looked for it. By and large, when you look in humid areas, where agricultural chemicals have been applied for long periods of time, you do indeed find these chemicals in the shallow groundwater.

But it is anecdotal. This has not been systematically throughout the United States. And as my colleague from the EPA just indicated, there is a systematic study underway to look at a very small subset of the question you raised. Pesticides—not all agricultural chemicals—but pesticides in drinking water wells. We are aware of the design of that study, and that study will be able to make some strong, statistically valid statements on the percentage of wells that contain pesticides. That is really the only systematic study that has been conducted.

That does not address your question, what is the nature and extent of groundwater contamination throughout the country.

Mr. **Grant**. We are trying to find out if normal agricultural practices cause groundwater pollution.

Mr. **Cohen**. And I am suggesting that it is quite common to look at areas where such practices have been underway, and to find water quality contamination related thereto. But quite common is not a quantitative statement. I can't tell you how many square miles per county over what period of time.

Mr. **Grant**. It can come from chemical spills, it can come from a city dump adjacent to agriculture areas, it can come from a number of sources. But no one has told us yet that normal agricultural practices cause groundwater pollution. It may be. But before we start implementing rules to limit the application of agrichemicals, which may be needed, don't you think it is necessary to find the extent of the problem first, and see who is causing it?

That's my plea. Going back to Mr. Emerson's comment, let's not cure the disease before we find what the disease is. It may be that our farmers are causing this problem. But if they are not, let's not cure the problem before we have got it. It could come from a lot of places, we understand that.

Let me get off that a second. Which is most harmful, pesticides or fertilizers, to the groundwater?

Mr. **Wayland**. Health and ecological endpoints can be very different. With pesticides there are a wide variety of health effects that are tested for, and EPA does approve pesticides for use, where at given levels of exposure those health effects could be significant.

Mr. **Grant**. They both can be potentially——

Mr. **Wayland**. It is blue-baby syndrome at one endpoint that one is concerned with nitrates.

Mr. **Grant**. How long has USDA been researching pesticides and fertilizers, Dr. Mussman?

Mr. **Mussman**. I would imagine it probably goes back prior to World War II, sometime in the 1920s or 1930s, thereabouts.

Mr. **Grant**. Particularly in the south, because of humidity and the temperature, farmers cannot presently farm without the use of pesticides. There are too many bugs, they get funguses, and all kinds of bad thing happen to crops.

Would you tell us briefly what kind of alternative varieties USDA is developing for farmers, let's say, wheat varieties or soybean varieties, or peanut varieties, that are pest-resistant?

Mr. **Mussman**. Mr. Congressman, there is work underway in the area of gene transfer, seeking genes that confer disease resistance or specific insect resistance in a variety of plants. I cannot point to any one in which the gene transfer capability has been accomplished. We are aware of instances in which certain bacteria can be put into a host plant, and the presence of that bacteria within the system prevents other insects from attacking the plant itself.

But as far as a genetic change in the plant, there is a lot of work going on, both commercially in the private sector as well as in our laboratories. At the moment, we do not have a unique finding that would confer this kind of resistance to insects in general.

Mr. **Grant**. The Secretary came to the Agriculture Committee and has suggested that we ought to appropriate half a billion dollars in this next budget for research and development. It would seem to me that if we are going to spend half a billion dollars for research, that we ought to be able to spend it on some specific project to find some specific alternative. If we don't want farmers to use pesticides, for example, then let's develop a variety of peanut so that a farmer doesn't have to use pesticides. Surely we can come up with something like that.

One of the most interesting things I have seen lately is a host-specific parasite that will kill hydrilla in lakes. Hydrilla clogs lakes, it's kind of a bad thing. We developed a bug that will kill it. Please tell me that we are going to use some of that money to do that sort of research, instead of all these esoteric, wonderful things that some of your brilliant scientists—and they are brilliant—want to do.

But give us something very practical and usable. Please tell me that we are going to be able to do that.

Mr. MUSSMAN. There are two points I need to make relative to the comments or questions you have raised. One has to do with the research initiative, which Secretary Yeutter raised. The Administration did indeed propose a certain level of funding, $100 million for the initial phase of that initiative, and out of that $100 million that is being requested for the 1991 budget, there is some $15 million that is specifically identified as focusing on the plant genome, being able to map the genetic content of specific, important economic agricultural plants to identify which genes are controlling which traits. If we can determine those kinds of genetic maps for different plans, wheat, corn, and so on, we will be in a position to know where the specific gene is located which can be transformed to introduce the genetic resistance.

Mr. GRANT. Is that enough money for you?

Mr. MUSSMAN. We are already underway on the study. You are undoubtedly aware that there is a massive initiative on the Health and Human Services Department on the human genome, and we think we will benefit greatly from piggybacking much of the plant research on the kind of methodology development improved technology coming out of the billion dollar effort in HHS to apply toward the plant sciences and move ahead much more rapidly than if we were on our own.

Mr. GRANT. Yes.

Mr. MUSSMAN. The other point, dealing with your concern over the farmers being told not to use pesticides, I don't want to leave any misunderstanding here. I tried to be clear early in my statement this morning that agriculture is not pushing for wholesale abandonment of current pesticide practices, or nutrient application practices. What we are saying is that there are alternatives. If in site-specific cases, farms where by trial and error, it can be shown that reducing the pesticide usage, modifying the application of nutrients, by changing other ways in which that crop is managed, that the farmer can still have the same profitability, the same economic soundness, that that is a very attractive way to go.

We certainly are not saying that there needs to be a wholesale decrease in pesticides until we have available for the farmer and an understanding by that farmer producer how to use the combination of management practices which will maintain his profitability and perhaps at the same time mitigate to some extent mitigate the problems of the groundwater contamination.

Mr. GRANT. Thank you.

Mr. Chairman, you have been very indulgent, and I thank you.

Mr. NOWAK. We thank you. Your attendance has been very important for your district, and for all the members to have the benefit of your questions. As we go on, we want to remind everyone here that we will keep the record open for any additional questions you desire to ask, and certainly will provide our witnesses with those written questions as you desire.

Let me now turn to Mr. Cox from California.

Mr. Cox. Thank you. I would just like to follow up on my colleague from Florida's comment and thank the Chairman and the ranking member for pursuing this inquiry into the important topic of groundwater quality. It is something which I and most Americans are intensely interested.

I think this is a particularly good panel representing the Federal agencies involved in groundwater quality. I would like to ask a question that will put all of you to some pains. I just came from a meeting with four of the top officials of the Soviet Union, from the Finance Ministry, the Council of Ministers, and the Central Committee. One of them was the head of the State committee on prices. They were asking us how they could move to a market economy. I suggested one thing he might do would be to abolish his job.

There are some things, given that we are all interested in cleaning up our groundwater, there are some things that local governments, counties and States can do better than the Federal Government. I would like to ask all of you what it is that the Federal Government is doing with respect to each of your agencies presently that States or local governments could be doing?

If I could ask Messrs. Wayland, Peck and Mussman to respond for their agencies.

Mr. WAYLAND. When I look at the range of activities that needs to be undertaken with respect groundwater, I think of research, which I think clearly is an appropriate role for the Federal Government to play, it realizes economies of scales, and so forth, I think of information collection and data management, so that all of those whose activities affect groundwater and who need to be concerned about it are better informed. I think there is room in that area for contributions at all three levels of government.

EPA's direct regulatory activities for the most part have been concerned with high visibility, high risk activities which in many cases present risks not only to groundwater, but also to surface water, or if you will forgive me, other environmental media. I am thinking about hazardous waste, and pesticides, where the food exposure route is also quite important.

I was a local planning commissioner, and I exercised responsibilities in that capacity that I think EPA has neither the ability nor the interest in pursuing in the areas of land use planning and decision making. We think, however, that it would be valuable for local decision makers and State decision makers to be informed about the potential environmental consequences of the kinds of decisions they are going to make otherwise.

I think our information dissemination activity and opportunity in groundwater is an important one, and one where septic tanks for the most part are not something that EPA regulates, but something which can have a very significant impact upon groundwater, and something which at the State and local level there can be some effective mechanisms to deal with.

I hope this doesn't sound like a cop out, but I really don't think the Federal Environmental Protection Agency at this juncture is exercising responsibilities that appropriately belong to local governments. The States for the most part are our implementation partners and arm in implementing most environmental laws. Roberta Savage will testify later on today and the States very clearly play a lead role in issuing permits under the Water Pollution Act, they also are implementing non-point source control programs in conjunction with local governments.

I think that while there is some inevitable tension, there is also an allocation of responsibility between EPA and the States that both understand and for the most part accept. I think we have limited ability to pass through responsibility or funds to the local level.

Mr. PECK. Let me start by saying that in our Water Resources Division we do surface and groundwater quality and quantity. Nearly half of that program, which is a nearly $300 million program, is a 50-50 co-op with over 1,000 State and local agencies. Under that cooperative program, we carry out most of the studies, which involve string gauging, or water well monitoring, or investigative studies in individual areas and research.

But that varies from State to State. In California, about $6 million on both sides is put up. Being a 50-50 match, we decide together what we are going to do. In some States, the State may have a lot of capability, and may do the water well monitoring. In some States, they have very good water quality labs, so part of the program is doing chemical analysis in their labs.

Some of the investigative studies are carried out by us or by the States, it varies a lot from State to State. California has a very capable hydrologist both at the State and local level. They carry out a lot of the studies.

Mr. COX. As a matter of fact, I am glad you used that example, because I represent part of California, and we have a serious groundwater contamination problem in part of the district that I represent. What we have found is that it has been the county that has come forward and paid for the cleanup, while the Federal Government is trying to clean up its act.

We had to take care of the problem and worry about who would eventually responsible later on. It is quite clear to me that the Federal Government is not always the best answer. We are back here in Washington, we are responsible for all of America, and if we are really serious about cleaning up groundwater problems, I just want to make sure that we do push to the State and local level.

Mr. PECK. The States have primacy in groundwater, and appropriately so.

Mr. COX. There will be a witness on our next panel, Patricia Jensen, from the Minnesota Legislative Water Commission, and part of her testimony is interesting on this subject. She has described a very admirable project that has been undertaken in Minnesota. The Environmental Quality Board in Minnesota, the Advisory Committee, recommended that the funding be taken out of the general fund, because all citizens benefit from this. But there is a limitation on the amount of money in the general fund, that's something we should relate to here in Washington.

As a consequence, fees were assessed on the use of groundwater, on the registration of agricultural chemicals, on the licensing of facilities and on dealers. So this is what's going on at the local level. We are having to in essence raise taxes in order to pay for this. That's why I hope you can tell me something in your agency that we can transfer to States or localities, because they are already having to pay for a lot of this.

Mr. **Mussman**. Just as my colleagues from EPA and USGS have mentioned, we too defer to the States as far as providing leadership for the individual programs. I think if the States, if there were no Federal program whatsoever, the States could by and large do a pretty decent job of managing their own programs. They have demonstrated that in a variety of other problem solving in the past.

However, we see the Federal, it is a very comfortable role, and I think the States are very comfortable with it, of providing a kind of generic research support which simply cannot be funded and duplicated in every State across the country. Obviously, if you can do the research in a national sense that may have an application to varying degrees in a variety of places, it is much more economical to do it that way than it would be to try to have everybody off doing their own research project.

Similarly, the support function we offer in the way of being a partner in the way of problem solving is a role which the USDA has played very well, and again one which the States would like to see continued. There is no indication that they are opposed to it. The cost sharing of many of the activities that are being undertaken at the State level where the Government pays a 60-40 share or 70-30 share on some of the practices that are being introduced to help support the development of certain practices, agricultural practices in the field by farmers, producers, and so on.

Finally, the multi-state regional kinds of projects that the Federal Government can provide, obviously, with full support and agreement on the part of the States involved where there are common problems that run over two, three or five States—all the corn producers, all the soybean producers—where having a national presence provides a mechanism for crossing over sharing information and taking what is learned in one place to other places that might not happen if individual States were doing it entirely on their own.

So yes, I see that there is a role. I would not argue to the death that a Federal role is an absolute necessity, but I think what we are doing is important to the overall effort.

Mr. Cox. Do you have any specific suggestions for something that we can transfer from USDA to States and localities?

Mr. **Mussman**. That is being done on a State-by-State basis through the State agencies, the Departments of Natural Resources, the water quality agencies, the extension program with the county committees, producer groups, cooperatives, and so on. That effort is already underway, it is being reemphasized and underlined to make sure that as much as possible is being taken into that environment and made available for those who wish to make use of it.

So I think everything that can be done is indeed being done at the moment. We are just going to continue to try and do it more effectively.

Mr. Cox. Thank you.

Mr. **Nowak**. Thank you, Mr. Cox. We will have a final statement from Mr. Stangeland.

Mr. Stangeland. Thank you, Mr. Chairman. I had additional questions, but in the interests of time I will submit them in writing. I want to commend this panel for some excellent testimony. It is obvious that we have a pretty good set of facts out there that is not perfect, it needs to be improved upon. My parting comment is that I am hopeful that your interagency working group continues, and if at all possible, improves. I think we can always improve.

Dr. Hauck, I hope that the interagency task force will avail itself of TVA's expertise and knowledge as well. I think we need all the knowledge from wherever we can find it. I am fairly comfortable that all of you are doing a good job. What I don't want to happen somewhere down the line is 60 Minutes or 20/20 to come out with some great expose, and shaking the confidence of the American public in their drinking water supply.

I think our actions have to assure that we are concerned about that, that we are taking the proper steps to preserve this great resource. We take it for granted that we walk into a hotel room or onto a farm yard, put a cup under the faucet and drink the water. You can't do that in too many countries in the world. A lot of countries would trade for that asset, and we have to protect it.

I am very pleased with your testimony. I think it is very responsible, and can be responsive and help us to be responsive. I like the idea that States have the prime responsibility and that States are doing their job. I think we have to help them in that overall broad picture, so that they have a better data base as well to work from.

For that, I thank you for being here. Dr. Hauck, you make an excellent point that farmers are not wedded to chemicals, it is an economic decision. If that farmer doesn't have to use a pesticide, it is dollars in his pocket. He is not going out there willy-nilly spraying this and spraying that just because he loves to go out there and spray.

The other point I would like to leave you with, and I am a firm advocate of better education, I guess I would like to implant this in your mind. The Soil Conservation Service was begun in the 1930s. It had a great number of good ideas for conservation practices for agriculture, and trying through education to get agriculture to use those, and it is just in recent times that agriculture has really started to shape up and use conservation, until it has used conservation practices to the extent they should be used to preserve the land resources.

I hope that education will work as far as utilization of chemicals to preserve that water resource as well. But we have to be ready to help them assimilate that education. If they don't utilize it, we should use some sort of stimulus to help States to make sure it is being utilized, so that we don't exacerbate the problem of groundwater in the future.

Mr. Nowak. Let me again thank you, and I think Mr. Cox's last question and comment about what we are doing and where we are going is probably indicative of what we would like to see as you go through your agency task force review, and have gathered up more information since our last Groundwater Act of 1988.

If there is any additional legislative authority you think could be useful in pursuing those goals and clarifying responsibilities or the ability to coordinate, especially as we turn and get a consensus here that the States are going to have a more and higher evolving role in this total groundwater area, we would like to have that information presented, formally or informally. It would be of great use.

You are going to be the coordinators of all that is going on throughout the country in your respective agencies, and if those kinds of initiatives come to your programs as you move through, we would be available for that kind of input. I hope that you will take advantage of that. There are so many different aspects of this to really gain and have an effective groundwater protection program. As we go through especially the next two groups of witnesses, I think you will find other areas, and I am sure as you go through your own reviews and the work you are doing, which is probably the best thing that has been done up to now in this whole area, that could all be helpful and I will hold the record open anticipating more comments. Even if comments are negative I would like to know that too, so we can build a record that is critical as we go along.

Again, I will wait with great anticipation for your additional comments, and thank you very much for your attention. I am sorry we took a little longer than anticipated.

[Mr. Wayland's prepared statement appears on page 136.]

[Mr. Peck's prepared statement appears on page 107.]

[Mr. Mussman's prepared statement appears on page 101.]

[Mr. Hauck's prepared statement appears on page 81.]

Mr. Nowak. Our second panel this morning is composed of the Minnesota Legislative Water Commission Executive Director, Patricia Jensen, and the Executive Director and Secretary-Treasurer of the Association of State and Interstate Water Pollution Control Administrators, Robbi Savage. If you will come forward, we will be happy to hear your testimony.

TESTIMONY OF PATRICIA JENSEN, EXECUTIVE DIRECTOR, MINNESOTA LEGISLATIVE WATER COMMISSION; AND ROBERTA SAVAGE, EXECUTIVE DIRECTOR AND SECRETARY TREASURER, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS, ACCOMPANIED BY LINDA EICHMILLER, DEPUTY DIRECTOR

Ms. Jensen. Thank you, Mr. Chairman.

Chairman Nowak and members of the subcommittee, it is indeed a pleasure for me to be here today from Minnesota as the Director of the newly formed Legislative Water Commission, which was formed out of the Groundwater Act in Minnesota in 1989. So we are just a few months old.

As far as we know, we are the only existing legislative water commission in the country.

With your permission, Mr. Chairman, I would like to divert somewhat from my written testimony and ask that it be entered into the record.

Mr. Nowak. Without objection, so ordered.

Ms. Jensen. The Minnesota Groundwater Protection Act of 1989 was passed in May of last year, and signed into law by Governor Purpich. This law established a framework for the protection of

Minnesota's groundwater. The framework centers around a staple of preventing the degradation of our groundwater. It also defines the procedures for promoting and then requiring the use of good management practices to keep pollutants out of our groundwater.

It is important to remember that this whole framework fits into a structure of laws and regulations that we already had in place.

Minnesota's groundwater is a valuable, yet very vulnerable, resource, which has gained increased attention over the past several years. We rely on it as a safe source of drinking water for two out of every three Minnesotans. In addition, of course, it is a critical component in many industrial processes and to the agricultural industry of our State.

In spite of the historically clean and abundant groundwater, we are finding some evidence of past neglect and abuse. The current indications are that while a relatively small percentage of available groundwater has been degraded, incidents of contamination are widespread and there is a continuing supply of new sites which are investigated and discovered throughout the State.

I would like to mention at this point that several comments were made relating to whether or not this was a crisis situation. I would like to emphasize that in Minnesota we are finding that it is not of a crisis nature, but is a status that we are finding that there is some contamination of the groundwater of our State in our sensitive areas. Our Department of Health and Department of Agriculture in 1987 and 1988 joined together to do a monitoring survey of over 500 wells in the State of Minnesota. Those were both private and public wells.

Let me emphasize that for the most part those wells were situated in sensitive areas, areas where there was sandy soil, or the Carson area in the southeastern part of our State. We found, not surprisingly, that in those areas, 39 percent of all of the wells did contain some chemical. In most instances, it was atrozine. There was some alachlor that we found, but for the most part it was the existence of atrozine.

But let me emphasize to you that in just very rare cases it came close to or exceeded any health standard. So there was some existence, and we have so noted that, but we are also somewhat relieved to know that it is not of a crisis nature at this time.

Reliance on our groundwater in Minnesota has increased dramatically in this past decade. In 1976, groundwater was 14 percent of all the water that we withdrew, and currently that figure is close to 25 percent. Generally, this water usage is in the category of public water supply, rural domestic and livestock use and irrigation, and self supplied industrial use.

In Minnesota we have more than 1,400 active and closed land disposal sites, and an estimated 300,000 individual septic systems, plus an additional number of larger drainfields and land application systems serving municipalities and industries. A third of a million tons of sewage sludge is spread at 1,000 sites across our State. Non-point source runoff has been identified as a contributor of bacteria and nutrients as it either infiltrates or enters the groundwater through wells no longer in use.

There are an estimated 60,000 underground bulk storage tanks in Minnesota, and leakage from the underground storage of liquids, mostly petroleum products, is estimated to be occurring in 10 to 25 percent of all underground tanks. There are currently 600 to 800 active sites in the State being investigated for cleanup under the combined State and Federal underground storage tank and petroleum cleanup fund programs.

We very much appreciate in Minnesota that Congressman Stangeland is sponsoring legislation to provide grant money hopefully for some of these small businesses that are having to deal with this cleanup.

The groundwater bill that we passed in 1989, I will have to tell you, started out with two different versions, one that went through our House and one that went through our Senate. There were some long hours of hearing and testimony, but I am here to tell you that there were some new-found partnerships developed during that testimony and during those long hours of hearings.

The agricultural community and the environmental community learned to work very closely together and I at the time was Deputy Commissioner of Agriculture for the State of Minnesota. I particularly appreciated seeing the environmentalists and agricultural committees sitting down around a table to discuss these common goals that they held. I would say also that unless they had agreed to cooperate in that fashion, and because of that, we would not have had a groundwater bill in Minnesota.

Under this new groundwater law, we established a cornerstone that is degradation prevention as a goal. In fact, the law itself starts out with a statement that says "It is the goal of the State that groundwater be maintained in its natural condition, free from any degradation caused by human activities. It is recognized that for some human activities this degradation prevention goal cannot be practicably achieved. However, it is intended that it be achieved. Where it is not currently practicable, the development of methods and technology that will make prevention practicable is encouraged."

The bill was divided into ten articles which were inserted into existing law. A significant amount of the language deals with pesticides and fertilizer programs. The legislators felt that this area of regulation needed to be greatly expanded to provide adequate controls on fertilizer and pesticide application, and especially in the area of providing and promoting best management practices.

Well construction and wellhead protection were also addressed in order to improve regulatory systems administered by the Department of Health. Drinking water safety and groundwater protection were the goals of these sections. For non-point pollution, the thrust of the new law is toward protection of groundwater through voluntary means. Education and information were the key elements of this section.

When water quality has been degraded, best management practices will be used to improve a situation. It would be only after these BMPs, which are voluntary, are proven ineffective, that more stringent regulation would be employed.

The Minnesota Groundwater Protection Act establishes a policy framework for groundwater protection that sets a goal of keeping our groundwater free of pollution, that addresses the special needs of areas of the State which are sensitive to contamination, and which combines education, research, and regulations to prevent further contamination of groundwater. It divides the responsibilities for these between the Department of Agriculture for fertilizers and pesticides, and the Minnesota Pollution Control Agency for all other pollutants.

More specifically to the bill itself, in my testimony I have listed several points that are key provisions of that. I will try to run through them fairly quickly. The first point I would like to draw your attention to is that the Department of Health is assigned the task of developing health risk limits for toxicants. It is that standard by which we judge the quality of the groundwater.

It was this particular issue that I think had to have been the most difficult for members of the legislature to deal with, just where do you set that standard? They came down on the side of setting a health standard and assigned that to the Health Department.

The bill provides for the first time a system to track construction and abandonment of wells, and provides for a pilot well sealing grant program. It provides State money for monitoring of public drinking water supplies as required in the Safe Drinking Water Act.

It also bans the use of new once-through cooling systems, and assesses a fee on existing systems. For those of you who are not familiar with once-through cooling, because I think the State of Minnesota may be the only State in the Union which has this practice, there was a feeling in the State that we had such an abundance of groundwater that we could use as much as we wanted for whatever we wanted. We set up a system of heating and cooling which took water directly from the aquifer and ran it through a heating and cooling system, then discharged it out into the sewer system. In effect we were using that groundwater once in a very significant amount.

In fact, in Minnesota, we have over 130 such systems, and use over 11 billion gallons of groundwater each year to heat or cool. The groundwater bill has put a prohibition on any further permits to such cooling and heating, and has also been revised to say that by the year 2010, all existing units will be retrofitted into some other source of heating and cooling.

The groundwater bill established a nitrogen study task force to review existing research and develop recommendations for a nitrogen fertilizer management plan for the prevention, evaluation, mitigation of non-point source occurrences of nitrogen fertilizers and State waters. We were very pleased to have Dr. Hauck from the TVA in Minnesota last week addressing that task force.

I should tell you that as we went through this groundwater bill, when the subject of nitrogen fertilizer contamination came up, people just sort of threw their arms up and said "How can we deal with this, we don't know exactly how widespread this nitrogen is."

It was decided that we would assign it to the task force to pull together all the information to act as a clearing house, and to report in two years to the legislative water commission what their findings were, and what they would recommend in the way of best management practices, and would also apprise us of the nature of the problem if one exists.

The groundwater bill also accelerated efforts to promote alternatives to chemicals based on the concepts of sustainable agriculture, and integrated pest management. State agencies were directed to use IPM in the management of all State lands. Again, Mr. Stangeland, I would like to thank you for H.R. 4509, which is a bill which addresses sustainable agriculture and IPM. The Legislative Water Commission in Minnesota is instructed with watching over policy development in the area of sustainable agriculture, and we appreciate every effort on the Federal level.

We also established in the groundwater bill a new agricultural chemical response and reimbursement count. This is basically our attempt to provide insurance for folks who are using chemicals. It is virtually impossible in the State of Minnesota and I expect in other States also, to get environmental insurance. Farmers often cannot afford the cost when they can find it.

This is an insurance fund which is supported by fees on chemicals, and is used to reimburse up to $200,000 worth of cleanup of chemical sites where we have had an incident.

Let me add also that one of the hallmark provisions of our groundwater bill relative to farmers and to end users of pesticides and fertilizers is a provision which exempts them from liability as a responsible party if in fact that chemical was applied according to label, and they have in fact been following the law all along. This insurance fund would kick in then to help those folks.

I think farmers have often fallen victim to this "responsible party" situation that have that's developed in the legal system, where we have tried to pull in everybody we can who has been responsible for any control over or application of a chemical. We have seen farmers in Minnesota who have gone under because of this situation. So this was our response, a way to help them pay for incidents that happened through no fault of their own or through no sense of their breaking any law.

We also provided this groundwater bill equal access to Superfund dollars for both the Department of Agriculture and the Minnesota Pollution Control Agency. We asked both of these agencies to study the priorities existing for the Superfund. We have just received a report of the Legislative Water Commission which indicated a support for what we see happening on a Federal level, and that is that the priority system is being looked at relative not only to areas of population and the danger of the incident to that population, but also to the nature of how it affects the environment.

The priority system as it was set up would send money into areas of population and often times the rural area then was not able to benefit from Superfund dollars because of the low population in the rural area.

We also established a pilot pesticide pickup program and banned non-returnable pesticide containers by July 1 of 1994 in an effort to help keep from generating new pesticide wastes in the future.

We provide for State grants to counties for completing and carrying out local plans to protect groundwater, accelerate research on the sensitive of groundwater to contamination through the development of regional geological assessments and county geological atlases.

We charged the Environmental Quality Board and the Legislative Water Commission with the responsibility for coordinating and monitoring all of its legislation.

Finally, the law provides a balance in funding between the general fund, which was assessed at $8.3 million to pay for this new groundwater bill, and fees mostly on chemicals that are used in the State of also roughly $8 million, which funded our total package.

The EQB's advisory committee recommended during this legislation that the funding all be taken out of the general fund, because the citizens are all impacted and benefit from clean water in our State. Because of a limitation on money in the general fund, the assessment of fees was a way of handling that funding problem.

It has been several months since the Groundwater Bill became law in Minnesota and implementation has proceeded for the most part in a timely fashion. We did have, and do have in this session of the Minnesota legislature, which may have adjourned early this morning, a technical amendments act. I am keeping my fingers crossed that that was passed last night. It was for the most part a technical amendment.

I would say as a credit to all who worked for the passage of that groundwater bill, the State agencies, the agricultural community, the environmentalists, and all the citizens who attended the many public hearings.

Thank you, Mr. Chairman, for the opportunity to present Minnesota's new water law. We at the Legislative Water Commission will be measuring the future progress of this landmark legislation, and would be happy to return at some future date to request to give you an update of our experience in Minnesota.

I will be happy to answer any questions you may have at the appropriate time.

Mr. **Nowak**. Thank you very much.

We will now hear from Robbi Savage, who is the Executive Director and Secretary Treasurer of the Association of State and Interstate Water Pollution Control Administrators.

Ms. **Savage**. Mr. Chairman, I would like to introduce to you and the committee my deputy, Linda Eichmiller. This is her first appearance formally before this committee, although she has been working with the staff for some eight years. I wanted her to have the opportunity to come and meet you formally.

The other thing I want to do is thank both the minority and majority staff for participating in our 10K Run for Clean Water on the 21st, our Earth Day 10K. I want you to know, Mr. Stangeland, that Gabe and Ben did you proud, along with the rest of the staff on your team, as did Dave Small on the majority side.

I don't think they came in first, but they did real well, and it rained and they came anyway, so we were very pleased. Secretary Lujan was with us for the day, as well as a number of assistant administrators at EPA.

I feel a little deja vu here, remembering that last year and the year before we were all sitting here in the same committee room, talking about the same issues, along with four or five other committees which have jurisdiction in the groundwater area on the House side, as well as the jurisdictional issues on the Senate side.

It is demonstrative of the complexity of this issue and the vast array of interest that is out there at the public level.

I would like to share an observation after nearly 12 years of mucking around in the water. We have the processes and procedures that we go through. Hearings are a major part of that. We heard from expert witnesses from the EPA, TVA, and the Department of Agriculture and so on. Yet, this is fundamentally different than most environmental programs that we work with. I would encourage you, Mr. Chairman, to consider an additional set of panelists that would bring in the users, the homeowners, the farmers, the State and local officials that are on a daily basis implementing these programs.

Some of us who live in Washington and talk for a living know what our members think, but it is really better, it can expand our understanding, to have those people who are right there trying to make these critical decisions, to come before you. So in your next round of hearings if you would consider expanding the witness list we would appreciate that.

You are well aware that groundwater is a major issue for the States. We have taken the lead, our association has been very active. Patricia just shared with you the fact that Minnesota has been in the forefront of these environmental programs, and we are delighted with the comments by each one of the Federal witnesses as well as each member sitting here today, who acknowledged that the States have the primacy to lead in the area of groundwater.

We are working together, we keep telling EPA and the other Federal agencies to get their act together. Before you try to tell State and local governments how to manage their own programs, get your house in order. So it is delightful for us to hear that they have committees, positions, policy groups and so on that are working to get the Federal house in order. I would suggest that it is time to get some State and local governments working in that arena as well on those task force and policy areas.

We are trying to do that, to get the State house in order, working with the National Governors' Association, the State drinking water officials, the State solid waste administrators, and our interstate conference on water policy and the western States water council, to try to come up with specific legislative initiatives that if in your wisdom you feel you need to pass groundwater legislation, could potentially be a road map for you.

Let me say that we are not advocating groundwater legislation. There are so many requirements currently on the books that to layer new requirements without thoroughly investigating what is already out there would be catastrophic for the effective implementation of the program.

So we really need to do our homework in this area. Mr. Stangeland, let me thank you for taking a leadership role in this legislation to integrate groundwater with surface water. We tend to think that one is down there, and one is up here. It mingles all the time, and citizens as well as professionals need to realize that we are dealing with a water resource, not something that is above ground and below ground, but a water resource.

Let me make it clear, as I indicated we are not promoting a national groundwater legislation. In fact many States in this country are opposed to it for the reasons I outlined. However, recognizing the way that the system works, we want to be sure that the States have an opportunity to share their views with you. What I would like to do is very quickly outline what the basic principles of groundwater legislation from the States' perspective might look like.

States are actively involved and are taking the lead in developing and implementing groundwater monitoring protection and management programs. They have been doing it for many years. Groundwater protection is the most decentralized activity implemented at the State and local level. Federal requirements should not be prescriptive or detailed, because the States have to have the flexibility to deal with their hydrology, their topography, and of course the political implications within each State. Congress should provide the means to resolve inconsistencies between the way States manage their programs if they occur as a result of inconsistent Federal laws or State laws.

Federal funding to implement these programs should be commensurate with the type of program that is designed. In our association, we initially suggested that maybe new funding would not be necessary if we could get the kind of flexible program that would in fact mesh with what is already out there. We feel so comfortable that States have taken the lead.

However, some of the bills we are seeing out there make us rethink that position, because they tend to be very complex and cumbersome.

If in fact national legislation were to be enacted, we would suggest that the national goal would be to protect existing high quality groundwater and to safeguard existing and projected beneficial uses. The quality of degraded groundwater should be restored wherever feasible to support identified uses.

States should continue to have the primary role. National legislation should address the comprehensive nature of groundwater and the plethora of existing Federal regulations and statutes. This does not mean, however, that Federal legislation should simply duplicate existing requirements.

We need to emphasize State prerogatives to managing their programs, reinforce the sole jurisdiction of States to manage groundwater quantity, identify specific components of an acceptable groundwater program, provide the States with maximum flexibility, apply equitable management and implementation at both the public and the private levels.

I am sorry to say that in many instances our Federal colleagues and their agency are as big or more significant in the pollution of groundwater as any private homeowner or even industry in many instances. So we want to see that whatever comes out of the Congress is appropriately implemented and equally discharged between the State and Federal, as well as the private sector levels.

There is a list on page seven of my testimony that shows you what you are well aware of, all the various Federal requirements and statutes, the drinking water, the Clean Water Act, the Resource Conservation, and on and on—mining, toxins, atomic energy. This program touches nearly every Federal agency in this country. Again, it is incumbent upon the Federal establishment to get its house in order.

We asked the States what they felt in advance of coming before you today. Sixty-eight percent of the States believe that the inconsistency and duplications have created problems for them in managing their groundwater programs, and 95 percent of the States agree that Federal laws should be changed to better achieve coordination and consistency.

I think in the interest of time, and the fact that I suspect that the members and the audience would like to have some lunch, I will simply refer to what we believe the State roles of responsibility should be for criterion standards, for the promulgation and performance of their programs, we believe there is significant information and management expertise, as well as a track record out in the States that a governor should be able to certify the success of their programs.

Linda, I would like to ask you very quickly to highlight what we see as the Federal role, as well as very quickly going over these last key issues.

Ms. **Eichmiller**. As our testimony indicates, six primary responsibilities should continue to be managing the programs and protecting the resource. At the Federal level, we do see a very integral role, and I don't want to belabor the point, but getting the Federal house in order as to their activities and the consistency of their policies and programs is really first and foremost in our minds.

We have seen a lot of attention nationally to our States managing their programs—are they efficient? Are they strategic? Are they coordinated?

We should just ask at the Federal level, the Federal family, those same questions in terms of their activities and programs. With USGS we of course see a tremendous role with research and monitoring, and a very significant role for the Department of Agriculture.

In addition, the types of things we see needed at a Federal level which keys up what they are best suited to as opposed to what we are best suited to do, which was highlighted earlier, is obviously in the area of Federal assistance. Funding is very important at the Federal level for the States to carry out those Federal mandates that affect groundwater. We feel strongly and urge your support for adequate funding under the Clean Water Act, the Drinking Water Act. This would require, under the Section 106 program, a doubling of funding to support State activities.

In the area of research I want to highlight our concern that EPA develop sound data on public health risks so that we can move forward as States to protect the public using that information. That is not something we can do that well in the research arena. There are obviously many other activities and research which could benefit from stronger Federal support through EPA, USGS, USDA, and the States.

Lastly, we do need assistance as States from the Federal government in several areas. Best management practices—what are the best ones to prevent pollution and minimize contamination. We need more attention to that area. We also need more attention to information sharing, development of scientific protocol, and those sorts of activities that were discussed in detail during the previous panel.

In closing I want to just state that citizen transit was discussed earlier. We are pleased to inform you that we are undertaking as an association to be ready by 1992 a study at the State level of the status and trends, the progress that has been made and the future challenges, which will focus in some detail on groundwater that will involve a lot of our time. We will be working with you, and hopefully you will find that information of use in your deliberations.

Of course, as Robbi said, we do not advocate Federal legislation, but we are very interested in working with you to evaluate the needs in national policy.

Ms. SAVAGE. Mr. Chairman, I would like to add in the status and trends area that we will be looking at 1972 through 1992, a 20-year look-see, at where we have come in the Water Quality Programs in this country; how much money we have spent, what kinds of programs we have put in place, how successful those programs have been, and this will of course be the 50 State administrators who are representing the programs that they have jurisdiction for. We look forward to being able to share that with you.

Mr. NOWAK. Thank you both very much. Your testimony was comprehensive and really joins what the general consensus is, looking at this role of coordination on the Federal level before going out to the States with any "mandates". Although there are certainly research and other kinds of activities that could be carried on, hopefully in cooperation with the various States, to produce groundwater protection that is effective.

You described your program in Minnesota, we try to ascertain how many other States would have an equal kind of broad approach that you have taken, Ms. Jensen. The number seems to be under 10 so far, perhaps even under five if you go paragraph by paragraph.

In your program, the fees that you mention here are taken from I guess it would be the second portion, not out of those general funds, where do they come from? How are they assessed?

Ms. JENSEN. They are assessed on distributors of chemicals in Minnesota. The wholesalers are responsible for turning that money over to the State. It is a tenth of one percent, and is based on the cost of the chemical value. That was a very interesting discussion we had as the groundwater bill moved through the legislature, and a very, very difficult decision.

We of course did work with the chemical companies, who were quite willing—well, I shouldn't say quite willing—but who were willing to pay their part as long as the State was also willing to pay a part from the general fund, to recognize this good, if you will, for the entire general population of the State. So this was our compromise, a 50–50 compromise.

Mr. NOWAK. The funding, then, is in place now, is that correct?

Ms. JENSEN. It is, just as we sit here, beginning. We made some technical amendments in the 1990 legislation to try to make that collection a process that was not too difficult. We were going to be collecting on a quarterly basis. We have made it an annual basis, and it is up to the industry itself to police it to make sure that the correct amount is turned over to the State.

As a matter of fact, as we were coming up with the funding for the bill itself, when we put down the $8 million from the Department of Agriculture, we were the ones figuring it, as I was the Deputy Commissioner. That is sort of a best guess figure, and we were quite dependent upon the agricultural community to self-police that, to come forward with that funding.

Mr. NOWAK. Ms. Savage, if I could turn to your broader context, throughout the nation, with the membership you have, are you anticipating this kind of a pattern to move forward throughout many of the other States? Is this active on many agendas in the States, through your organization or through the State legislatures?

Ms. SAVAGE. Mr. Chairman, I have not had a chance to fully evaluate the Minnesota program, and as Patricia said, it is one month into its operation. So just to commit 49 other States to implementing a new initiative would be somewhat irresponsible, but I can say that the majority of the States have their strategies in place, are developing their groundwater programs, or have had groundwater programs in place for a number of years.

The entire process, if you recall the testimony that all the witnesses including ourselves, have given, is that it is essential for the States to have the kind of flexibility to address the problems they have in that particular State. It would be foolish for the State of Arizona to model after the State of Minnesota, when they do not have the kind of lake resources, they do have the hydrology or topography issues to deal with.

We want to be sure that whatever programs emerge, they are State specific and will address the problems in that particular State. But to say that the States are active and are going to be active in initiating groundwater protection programs in their State, absolutely.

Mr. NOWAK. The flexibility issue is one that is very evident in this whole area. In fact, I think most of the contamination that has been discovered has been relatively shallow water areas, or shallow aquifers, not the very deep ones. Also, your own testing has shown that you have only limited problems in your wells and very, very few of those have exceeded the guidelines that you adopted.

That being the case, I wonder if the States are all going to start making surveys and how the U.S. Geological Survey fits into that with the service that they could perform for the States to get the initial kind of response or knowledge or information base that Minnesota did? Are many States doing that?

Ms. SAVAGE. Absolutely. As Phil indicated during his testimony, the majority of the States are under a cooperative agreement with USGS and have been for many years. Groundwater has been one of the parameters of their evaluation for more than a decade. I was delighted to hear Phil say that the status of our water throughout the country is very, very good. I would not see any significant change in that relationship, if nothing else an enhancement to the working relationships the States have had with USGS and their research role. That is very critical.

Linda indicated during her part of the statement that there are certain activities that the Federal Government can handle much more effectively. There is no reason for 50 States to be out there doing independent research, when the Federal arm of the Government could be doing that research and sharing the information.

On the other hand, it is not necessarily the most appropriate to have the Federal Government folks here in Washington dictating how a program should be managed in Minnesota, or Florida or California. I was delighted to hear Mr. Cox say that the groundwater problems in his district were solved by a cooperative relationship with a local government and the State, without Federal involvement. That's the way most of it happens in this particular program, and most of the others.

Mr. **Nowak**. Mr. Stangeland?

Mr. **Stangeland**. Ms. Jensen, I have to complement you and the State for what you have done. Actually, you can say that when I first heard Minnesota was working on a groundwater bill, I thought number one, that it would look to a regulatory regime, and number two, I questioned whether you had a data base to do anything.

But you have done a magnificent job, and I think it is a landmark.

But I know you will agree, and I agree with you, Ms. Savage, your five points, I couldn't agree more. We need to let the States do this, and have the flexibility. Because what works in Minnesota may not work somewhere else. I would daresay, Ms. Jensen, that in some areas an interagency working group within the current structure of the State government might do what you are doing.

Let me ask you a question. Do you foresee any problems for the Water Commission in dealing with turf with the Department of Health, MPCA, or the Department of Agriculture? How have you resolved, or how do you anticipate resolving that?

Ms. **Jensen**. That is a wonderful question. I have to tell you we have laughed about it already a few times. At some risk I share with you that there is what I would call a turf war going on within the legislature itself, I had taken this new job six weeks ago, and left the Department of Agriculture. I got over to my new office only to find that the House had eliminated the Legislative Water Commission in the new technical act and placed it somewhere else where the Chairman of the State Department could have control over it.

Just two days ago, I was assured that the Legislative Water Commission would in fact survive. So we have had many—I should say laughs, because it is not really comfortable to leave a job you like really well, to go to another one, and then have it eliminated.

But on the serious side, there is discussion that has evolved relative to the part that the legislative branch plays, and the executive branch, and this whole area of oversight on this specific area. It does not include just the groundwater bill. It also includes surface water. As I indicated in my testimony, sustainable agriculture, nitrogen, acid rain, the legislature is adding more and more duties to this Commission as it goes along.

I think the success of the Commission in the future will deal with our ability to keep the lines of communication going with the State agencies who have them cooperate with us, if you will, to set up task forces, to work together to share information. I am very much an optimist about this. I think we all have the same goal, which is to protect the quality and in Minnesota, the quantity, of our groundwater and clean surface water, as well.

So with that same goal in mind, we will have to set aside some of the turf issues, and sit down around a table. I think there is enough glory to go around. We can pat each other on the back, and I can tell you that the Minnesota Department of Pollution Control and D&R are in fact working together. There are some new coalitions being set up within State agencies as well as outside, with the agricultural and environmental communities.

The one I think we still have to work on a little bit is getting the urban and rural communities comfortable. There is a lot of finger pointing going on, especially from the agricultural perspective, from which I come. I was often the one at a meeting to say that the golf courses buy an awful lot of pesticide and fertilizer, and I think that coalition needs to evolve, also.

Mr. **Stangeland**. How large a staff does it require?

Ms. **Jensen**. As I sit here, I am it.

Mr. **Stangeland**. Let me ask you, in your vision, how large do you anticipate you will have to be to get your mission accomplished?

Ms. **Jensen**. I think that will fluctuate. And the law is set up to flexible. Flexibility is our key word. We are given the authority to hire legal and technical staff, to hire them on a permanent basis as we grow, or to hire consultants on a temporary basis as particular projects arise. That is how I will approach the future, that if the legislature has given me a function which is a particular project, as they have, to review the nitrogen task force, I will bring in a consultant on that basis.

Mr. **Stangeland**. Do you see, somewhere down the road, the requirement that you might have to a State agency, as opposed to a legislative commission? What I'm saying is, can you as a legislative commission have the authority, or does the law give you authority, to work with counties and municipalities throughout the State, drawing upon their expertise, working with them? Legislative commissions have had good success in Minnesota in many cases. But in the instance of groundwater, I just wonder, and yet you don't want to create a whole new bureaucracy out there either.

Ms. **Jensen**. That is an interesting question. As an attorney myself, I thought this was one of the most wonderful separation of power positions one could hold. I am having more fun in my own mind figuring it out.

But I think the agencies within the Executive Branch do exist currently to handle the water issues that develop in the future. It is my intention as Executive Director of the Legislative Water Commission to recognize that our authority in the legislative branch is much different, that we write the law. That is why we will all cooperate with one another, because the bottom line is that when the Executive Branch, when the agencies come in, as they do here, in Minnesota, that they recognize that we have the ability to recommend to colleagues in the legislature to change the law to rewrite the way they do business.

Because of that balance of power, I think it will work. We will have to be careful. We should not overstep that bound.

Mr. **Stangeland**. Here's my next question, and it cannot be answered today. But I will advise you, because I fully believe that Federal requirements should not be prescriptive, that they should be decentralized. We have legislation languishing here that would set up a regulatory regime. The last thing in the world I want, at least, and I think really the Congress ought to think seriously about this, is that we ought to develop a regime of land use planning from Washington on what farmers or people are doing in Wilkin or Otter Tail County. We should never be involved in that. That's your role.

Then, in your poll, I guess when you say, Ms. Savage, that Congress should provide the means to resolve inconsistencies which occur as a result of multiple Federal laws, I think we will depend on your people to tell us where those inconsistencies lie. We will never hear it from the agencies. EPA will never come in and tell us that this law is restricting the States' abilities to do something, and you must change it.

That is not going to happen. USDA is not going to tell us that. We need to hear it from the grass roots as to what changes are necessary. When 95 percent agree that Federal law should be changed to achieve better coordination and consistency, we need to hear from you what laws are needed to change to provide that coordination and better consistency.

Ms. **Savage**. Thank you, that's absolutely right, and that is one of the reasons I opened my comments the way I did. Because this program is so fundamentally different and because we continue to say that the State and local governments are the lead in groundwater protection, bringing those managers, those people that are the users, the managers and the implementors of the program in to sit down and chat with you about the problems they are having.

I will give you one example. In siting a lagoon, under the Clean Water Act, you have MPDS implications for permitting under the RCRA program, and you have a different set of circumstances under the CERCLA program, you have to clean up to background levels. It would the same lagoon, having the same discharges, but depending on what Federal statute you wanted to implement, you would handle it totally differently.

The implications for the site owner would be significant, from minimal cost to absolutely astronomical costs, and would be a political judgment call or a bureaucratic judgment call of the person or agency implementing that particular law.

So we have got demonstrations all over, and I would love for you to request from their—shoot me for this—but the Western Governors Association has done an organization chart of all the statutory requirements, regulatory requirements, bureaus, directors and whatnot, involved in the management of groundwater and it will take up the majority of that wall. So I encourage you and the staff to request that. If nothing else, they can come and share it with you. It is mind boggling to see the web of complexities of this program.

Mr. **Stangeland**. This is what I think we are about. We need to get the Federal Government out of the way so that you can do your job, if we expect you to do your job. But we need to know where we are in the way, and where we are hindering or hampering.

I can recall, Ms. Jensen, vividly, and it is exacerbated out here, sitting in a State legislature in a tax committee and writing tax law based on the Commissioner of Tax Law's recommendations. He was a brilliant man. When I went back home and talked to the county treasurers, they said that will never work. We never went to the grass roots to say "Here's what we want to do. Can you administer it?" That's what we need from you, is to know what we can do out here to get the job done, and get it done effectively and responsibly.

Ms. EICHMILLER. One of the things in the interim, we are certainly most willing to help identify gaps that really do need to be addressed, but we really do need your diligence and support in encouraging the Federal agencies, now, to get their act together. As Robbi said, we want to work with them. But if that doesn't happen, then we are going to have laws we all want to avoid.

We just need to see progress.

Mr. STANGELAND. We hope you will provide us with specific information as to where the Act is not together, so we can get at it. We don't have a crystal ball, we can't foresee all these things, but you people who work with it can. I just ask for your help, and I know you will be forthcoming.

I want you to know that your thoughts and ideas and critique are welcomed and needed for us to do a better job.

Ms. SAVAGE. Thank you. I would also encourage—Mr. Emerson suggested that he had not had an opportunity to see the documents that EPA is distributing to the governors and to organizations around the country. They are in the process of coming to closure on what strategy their agency should take relative to this particular program. I was discussing it with the leadership at EPA just the day before yesterday.

I think there is some flexibility in that discussion, and I don't think they have come to closure. But one of the options outlined in the option paper that is obviously missing is status quo. Is this program working? The assumption is that the program is broken and we have to fix it. There is no recognition that perhaps the way we are going is with some more vigilance, with tweaking and enhancing our programs.

But maybe the relationships we have not are the best way to handle it. That's not even an option in the current EPA position paper. Again, I encourage you and the staff to request copies of those if you don't have them, and help us in commenting back to the agency.

Mr. STANGELAND. Again, I want to thank you. I can assure you, Ms. Jensen, that future hearings in future Congresses will be more than interested to hear about Minnesota's success. Also, hopefully your landmark legislation will become just that for other States to look at, and enable them to better cope with the problems, that we can leave the responsibility where it rightfully belongs, right down there on the local level.

Thank you, Mr. Chairman.

Mr. NOWAK. Thank you. At this time let me thank you for your testimony. It will help us as we move forward, and I think the Minnesota experience here as time goes on will prove to be very fruitful, and will prove to be another model that comes out of Minnesota. We congratulate you for your initiative, and I want to again thank Ms. Savage for her input and for representing her membership so well.

Thank you so much.

Mr. **Stangeland**. Mr. Chairman, I ask unanimous consent that I be allowed to submit some written questions to the witnesses.

Mr. **Nowak**. So ordered.

[The questions and responses follow:]

QUESTIONS BY HONORABLE ARLAN STANGELAND
TO PATRICIA JENSEN
LEGISLATIVE WATER COMMISSION
APRIL 25, 1990

- In your testimony, you refer to provisions in the Ground Water Protection Act of 1989 regarding exemptions from liability for farmers. Is this for those who have lawfully applied pesticides or other agricultural chemicals? How widespread was the "problem" that prompted the provision in the 1989 Act? Has EPA or MPCA attempted to use Federal or State Superfund authorities in response to ground water contamination involving agricultural chemicals? How are the provisions to be implemented? Has anyone claimed the exemption since enactment?

- Based on your experiences with ground water protection in Minnesota, what would you recommend with regard to a national ground water protection goal? Specifically, what is your position on section 201 of H.R. 4509, the Sustainable Agriculture and Clean Water Act of 1990? I wrote this provision with the intent of highlighting the important link between surface and ground water and increasing ground water protection efforts. Nothing in the goal, however, is meant to signal a desire to establish Federal permits, such as the NPDES permits that apply to surface water discharges, or to intrude upon State or local prerogatives.

- Please feel free to comment on any other provisions in H.R. 4509. Do you have any specific comments or concerns about reauthorizing sections 208(j), 314, and 319 of the Clean Water Act?

RESPONSE TO QUESTIONS
OF HONORABLE ARLAN STANGELAND
BY PATRICIA JENSEN, LEGISLATIVE WATER COMMISSION

MAY 17, 1990

Relative to your question on liability exemptions in the 1989 Groundwater Protection Act, there was a provision regarding farmer exemption if chemicals were lawfully applied. Specifically, an end user or landowner is not liable for the cost of active cleanup, or damages associatedwith or resulting from agricultural chemicals in groundwater, if the person has applied or has had others apply chemicals in compliance with state law, with any applicable labeling and orders of the Commissioner of Agriculture. (Minn. Stat. 18D.101)

In response to your inquiry of how widespread the "problem" is that prompted the liability exemption, there is not a large number of farmer incidents being investigated. However, there has been a significant shortage of liability insurance available to handle such situations if and when they arise. It was this "insurance problem", along with the concept that we ought not to punish those who have been law abiding and judicious in their use of ag chemicals, that prompted this liability exemption provision in the law. As of this date, no one in Minnesota has used the exemption, but the law is still quite new.

The Minnesota Pollution Control Agency and the Department of Agriculture have used both federal and state superfund authorities in response to groundwater contamination involving agricultural chemicals. The provisions are implemented by the Commissioner of Agriculture who has lead authority for agricultural chemicals in Minnesota. In fact, the 1990 Minnesota legislature passed groundwater amendments that, among other things, allow the commissioner to use either the pesticide and fertilizer laws and regulations relative to contamination, or to use the environmental response and liability sections of the law. In the matter of expenditures for cleanup relative to an incident, Minnesota law requires that state and federal superfund dollars must be used, if available; otherwise there is a special fund set up for agricultural chemical response and reimbursement. (Minn. Stat. 18E.03) This special fund is used for chemical incident response and is established to reimburse eligible persons for reasonable and necessary costs incurred in taking corrective action. It operates in the nature of an insurance fund, thereby protecting law abiding recipients from costly cleanup.

Based on my experiences with groundwater protection, I would say that it is important, as stated in sec. 201 of H.R. 4509, that there be a national policy on groundwater and that it be implemented expeditiously. Minnesota has been at the forefront in this important area, and many other states have also acted; however, some have not. Unfortunately, our precious resource of groundwater has no state boundaries, so it is important to have at least some baseline protection. A national policy could provide that baseline. I would encourage you also to continue to allow for state prerogatives to pass legislation more restrictive than federal.

And finally, you ask for any comments I might have regarding H. F. 4509. The policy behind H. R. 4509, of promoting sustainable agriculture, integrated crop management and best management practices, forms the cornerstone of Minnesota's state law on groundwater protection. Your emphasis on education and research is vital. In my opinion, scientific data and research in the water area is currently inadequate to form the proper framework for protection of our resources. We still need to obtain information and data about both the quantity and quality of our water supply. As that information is obtained, we must then assure that it reaches those who need it most - farmers and others - so that they may act accordingly to protect our natural resources.

It is my belief that most people will act responsibly in the use of ag chemicals if they are given appropriate information and advice.

I appreciate the opportunity to provide these additional comments for the record, and thank the subcommitee for their interest in this important issue of water protection.

[Mr. Jensen's prepared statement appears on page 95.]

[Mr. Savage's prepared statement appears on page 126.]

Mr. Nowak. Our last panel will be the American Water Works Association, Thomas J. Buchanan, Chairman; and the National Well Water Association, Michael A. Apgar, Director, Association of Groundwater Scientists and Engineers. There was a third member of the panel, Mr. Jay Vroom, but I understand there was a death in his family, and he has had to go back and won't be able to appear. What we are going to do is place his submitted testimony in the record, and contact him later.

[Mr. Vroom's prepared statement appears on page 134.]

Mr. Nowak. Our first witness will be Mr. Thomas J. Buchanan.

TESTIMONY OF THOMAS J. BUCHANAN, CHAIRMAN, AMERICAN WATER WORKS ASSOCIATION INDUSTRY TECHNICAL WORKGROUP ON GROUNDWATER AND MICHAEL A. APGAR, DIRECTOR, ASSOCIATION OF GROUNDWATER SCIENTISTS AND ENGINEERS, NATIONAL WATER WELL ASSOCIATION

Mr. Buchanan. Thank you, Mr. Chairman. I am going to summarize our statement and request that our full statement be made part of the record.

Mr. Nowak. Without objection, so ordered.

Mr. Buchanan. I am Tom Buchanan, a member of the consulting firm of CH2M Hill, here today representing the American Water Works Association, AWWA, as part of that organization's special technical advisory group on groundwater protection.

The AWWA appreciates this opportunity to be a part of the subcommittee's deliberations on groundwater quality issues. The AWWA is a 109-year old scientific and educational association that is the largest association of professional drinking water people in the world. We have some 50,000 members that include utility operators, engineers, scientists, professors, educators, health regulators, environmentalists, and many others that have a genuine interest in drinking water.

Our membership also includes roughly 3,500 water utilities that supply about 75 percent of the Nation's drinking water. As you know, groundwater quality issues are extremely complex, and impact a wide spectrum of interested parties. The AWWA has a particular interest in legislative initiatives to protect groundwater quality because of our role in providing safe drinking water to the public that we and you serve.

In the last few years many bills relating to groundwater have been introduced in Congress. Although we feel Federal legislation is needed, no bill has yet contained all of the provisions AWWA would like to see in groundwater protection. My statement today represents a series of ten concepts supported by the AWWA concerning the protection of groundwater quality.

Many of these concepts you are already familiar with from previous witnesses and pending legislation. Nevertheless, we appreciate this opportunity to emphasize again their importance.

The first concept is that groundwater resources must be managed and protected to insure optimum protection of water of the best attainable quantity and quality for future and present generations.

Second, State and local governments should have the primary responsibility for the management of groundwater resources, because groundwater quality and usage varies dramatically across the country. State and local governments can best assess economic, social and environmental impacts of groundwater management policies. State and local governments have the best knowledge of site-specific technical issues. Also, State and local governments are in the best position to implement protection programs in view of their traditional roles in regulating land use.

The AWWA recognizes that some instances exist where interstate conflicts can occur regarding groundwater. However, these conflicts seldom involve more than two neighboring States, and should be resolved at the State level.

Third, Federal involvement in the management and protection of groundwater is needed to support State and local governments. Technical guidance, seed funding of State programs, and research programs are needed at the Federal level. Oversight of State and local programs should be provided. For example, by defining minimal elements of a comprehensive State program, and developing flexible State program approval and disapproval criteria that are performance-oriented.

Fourth, the most important use of groundwater is as a source of drinking water. All groundwater resources for drinking water supply must be given special attention.

Fifth, Federal, State and local efforts should focus on groundwater pollution prevent. The cost of cleanup requires a strong preventive strategy. If we don't prevent pollution now, the water utility is given the burden of removing someone else's contamination to make our drinking water safe.

Sixth, groundwater quantity issues such as control of withdrawals and groundwater recharge are an important concern in formulating a national groundwater quality protection strategy.

Seventh, the cleanup of contaminated aquifers that are the only reasonable source of drinking water for human consumption must be included in any groundwater protection policy.

Eighth, funding for groundwater programs authorized by existing legislation such as the wellhead protection program under the Safe Drinking Water Act amendments of 1986 needs to be appropriated.

Ninth, AWWA urges Congress to clearly identify the roles of all Federal agencies involved in groundwater issues to improve coordination and avoid duplication.

Finally, increases and reallocation of existing technical and fiscal resources at all levels of the government is urgently needed to ensure implementation of groundwater protection policies and strategies.

In summary, groundwater is an important resource that must be protected. State and local governments should have the primary role in developing and implementing groundwater management programs. Federal legislation is needed to increase research funding to develop training and guidance programs for States, to develop a centralized source of groundwater information, to develop groundwater standards, to clean up critical aquifers for potable water, and to encourage and monitor State groundwater management programs.

Care needs to be given in designing any Federal legislation because of the complexity of the issues involved.

The AWWA and I appreciate this opportunity to testify today. We welcome your questions and comments.

Mr. **Nowak**. Thank you very much for your statement.

Let's turn to our second panelist, Mr. Michael Apgar.

Mr. **Apgar**. Good afternoon Mr. Chairman and members of the subcommittee.

I am Mike Apgar, professional hydrologist, and I appreciate the opportunity to be here to testify today on behalf of the Association of Groundwater Scientists and Engineers.

I have a prepared statement which I would like to submit for the record, then I will try to summarize it.

Mr. **Nowak**. Without objection, your total statement will be inserted into the record.

Mr. **Apgar**. Thank you.

National Water Well Association is a non-profit trade and professional society that represents the entire spectrum of the groundwater industry, and the Association of Groundwater Scientists and Engineers is a technical division of the National Water Well Association. It has more than 14,000 members, most of whom are prominent practicing hydrogeologists in this country.

It produces a number of technical journals, including groundwater monitoring review, the Journal of Groundwater, and a number of other publications. It conducts at least 80 educational programs and seminars, short courses and conferences a year for members of the profession.

Over the last 40 years, National Water Well Association has promoted better understanding, wise development, protection and management of groundwater. For decades it has used the slogan "Groundwater—our most precious resource" as a means of raising consciousness and concern about groundwater.

As a concerned citizen and taxpayer, I am here today to tell you that some of the current laws and the administration of those laws on the Federal level subvert good science and engineering practice. I believe we are in many cases mired in misconceptions, encumbered by inflexible and prescriptive rules and red tape, and saddled with a number of inconsistent requirements.

We simply are not getting the benefits for human health and the environment commensurate with some of the expenditures in the more prominently funded Federal programs.

Groundwater occurs in a wide variety of settings which affect the availability, yield and quality of the groundwater. Many contaminants are attenuant in in-flow systems, some are not, at least not to a desirable degree within short distances.

Nevertheless, most groundwater quality problems are local problems, and they really require local solutions. Groundwater occurs in aquifers which have three functions. One is that they maintain the fair weather base flow of streams. Another is that they are sources of water supply to wells. A third and often unappreciated function is that they do attenuate contaminants. All these activities often occur within the same area, that is one aquifer can provide all these functions.

A common and simple example is with septic systems, where wastewater is put into the ground, and a water supply well withdraws water on the same property, usually only 100 feet away, with quality that is adequate to drink. Obviously, the idea that some contaminants are removed in the ground has been with us a long time. Although we have found an increasing ability to see small concentrations of contaminants, that's not entirely true, some contaminants will travel, and some situations are more sensitive than others. We ought to appreciate the fact that nature is on our side, and helping us with cleanup, even as groundwater moves.

Every site is different and every hydrogeologic environment presents special circumstances that need to be addressed in a study and evaluation of possible remedies. No single set of standards for groundwater quality is appropriate. The requirements for a particular quality of groundwater ought to depend upon use. Nevertheless, we are spending millions, and actually billions, of dollars, to achieve drinking water standards, where groundwater is not potable, in some cases where the groundwater is not used, where it is not very productive.

In many of these cases, alternative supplies, if needed, or available, or treatment would provide an adequate and cost-effective solution. I think the public demand for non-degradation and complete cleanup of groundwater is not always possible, it is not always realistic, and not always necessary to protect human health and the environment.

It is not to say during Earth Week, or just following Earth Week, that we advocate pollution. We certainly think that the emphasis ought to be put on preventing pollution from occurring. Nonetheless, the other statements I mentioned are true.

Laws which contribute to adversarial relationships between regulators and the regulated community create a need of massive documentation and cross checking and oversight which has been extremely inefficient, and very expensive. A lot of times, the cost of obtaining data with the oversight checking that goes on, results in such high expenses that we are actually collecting less information on a site than we might otherwise. We don't collect multiple sets of information so that we have no sense of what groundwater quality trends in an area are, before we make multi-million dollar solutions on remediation.

Another thing that is a real problem is that legislatively mandated quotas for investigation starts or cleanups, and you have heard how many starts and investigations have been made on Superfund sites, and such things today, have led to some very perverse results. This is similar to equating or trying to use body counts in a war situation to measure progress. It leads to a bean count mentality, and in a lot of cases we have some sites that don't represent significant groundwater problems that are added to the national priority list as magic beans.

We even have a reversal of priorities where we go ahead and try to address and try to claim credit for remediating sites that are not problems and let the other ones fester.

I think one of the things all this activity in the RCRA and CERCLA areas in the last decade—much of my testimony has been addressed to that—have created a large number of field experiments, for better or worse, from which we have been able to learn quite a few lessons. These include the fact that few cases occur where widespread contamination of major aquifers has been done. Most of the problems are relatively low.

The attempts at remediation of these sites are extremely costly. They run to tens of millions of dollars per site, and they are rarely successful in returning water that is contaminated to drinking water purposes. They have often achieved little in reducing risks to human health and the environment, and in short are not worth the money that has been spent on them, except that we have learned some of these lessons.

The risks of contaminating groundwater have been overstated in many cases. The activities again ought to be conducted and solutions to the problems addressed, and the solutions to these problems worked out flexibly in a State and local level, with as little adversarial action as possible.

I don't think we need new legislation, we need wiser administration of the existing rules. We do need some straightening out of the inconsistencies between the existing statutes. But it is difficult to attempt that at this time. I think we have already heard you say that Federal legislation ought to be simple. It ought not be more prescriptive than necessary, it should be practical, flexible, ought to allow coordination with State and local activities on controlling both water quantity and land use. It ought to attempt to reduce bureaucratic red tape.

I would like to close with that, and thank you very much. If you have any questions, I would be happy to answer them.

Mr. NOWAK. Thank you very much.

Let me ask both you gentlemen a question. You have talked about flexibility. You recommended that as a standard that be maintained in this whole area. You were here when the Minnesota Commission plan was explained. Do you think that could be a pattern that will develop throughout the United States?

Mr. BUCHANAN. Mr. Chairman, I think that other States are going to look at the Minnesota experience. The problem we have this morning with the Minnesota experience is that it is brand new, and we do not know how well it is going to work. I think we can look at other experiences throughout the country, Florida is one example, Arizona is another example, Connecticut is an example, Washington State is another example, where very good, strong State programs have been put into place and have been effective.

Mr. NOWAK. Is there an adequate base of research and/or inquiry done to the Federal agencies so that they can react to a State problem or to a group of States' research requirements?

Mr. BUCHANAN. I think the research that EPA, particularly, and the USGS has done has been very effective in giving us an understanding of the contamination issues, particularly relating to volatile organic compounds, and the pesticides and the nutrient problem. There is a lot more that needs to be known. We in the American Water Works Association are doing some research on our own to assist EPA and hopefully provide testimony to EPA on the effects of various alternatives that they are looking at in control and regulation and control levels for various contaminants. We think there is a lot of additional work that needs to be done, and resources have been limited.

EPA has been most responsive to the research that we have initiated on the basis of contributions from our members.

Mr. APGAR. Let me add that I did not mean to be critical of everything that EPA or the Federal Government does. I think there is an awful lot of good work and extremely intelligent people in that organization. They are learning as they go along. Certainly the information that has been generated by Federal agencies such as the USGS, but including EPA, has been extremely valuable and continues to be that way. We are going to continue to learn lessons as to how these contaminants behave in the subsurface, and also what the health effects and implications are of finding them at the very low levels that our instrumentation is able to detect now.

Mr. NOWAK. You raise a very good point. A lot of chemical contamination, whether it be in the ground or in groundwater or sediment—years ago, when these were released into the environment, no one had any idea what the results would be of that particular contaminant being released, or of the combination of that contaminant with others as it got mixed either in the water or in the landfill, or bottom sediment that we are finding around. We are trying now to look at that site, or that bottom sediment and I guess the next step is how does that relate directly to health?

It is in the water, it is kind of out of sight, and out of mind, and except for the fish that have cancer, and the fish that won't even eat other fish, we are all right. Yet, 25 years ago, we probably could have measured the amount of that chemical contamination.

I just wonder—we have heard all the Federal agencies say they are cooperating. I wonder if that cooperation is going up and coming back down as effectively as it could be, or is there something else we should be looking at as far as a Federal legislative initiative, perhaps not a bill, but a source that would make that whole process run smoother for the States, and for the localities that are trying to work with EPA, and both your organizations have done that to some degree.

If you have any further comments after listening to them this morning—and I have asked them the same thing. How can it work better?

Mr. BUCHANAN. One thing that is really needed, Mr. Chairman, is improved information dissemination. There is a lot of information available in the Federal agencies, trying to understand what is available and making it known has been a major problem. I think some work needs to be done by coordination among the Federal agencies to improve that.

I think there needs to be a clearer understanding of the role of the Department of Agriculture and the Department of Interior and EPA in the groundwater issue. What are the major responsibilities of each agency? You find sometimes that EPA is in the data dissemination area and the data collation area and is that the USGS' role?

You find sometimes that the USGS is into research on things that really may fit more in the EPA realm. I think there is some coordination that is needed there.

I do want to comment for a moment on your statement of the magnification of the problems into the bottom sediments. We have the biological movement up the chain, if you have it in the water, you have an order of magnitude, more in the sediments, and then the vegetation and the aquatic animals, magnify the problem. It is a serious problem. When I entered this business, we used to be able to analyze for 30 parameters. Today we are looking at 300 to 400 parameters we can analyze. We didn't even know what the problems were 15 years ago, we just have a better understanding now.

I think we have made a lot of progress, and I think this committee's work in getting the Federal agencies to come here, and to talk to you and to begin to think about how they can better coordinate are steps in the right direction that will help the water supply industry.

Mr. **Nowak**. Thank you.

Mr. Stangeland?

Mr. **Stangeland**. Thank you, Mr. Chairman. Thank both of you.

I have no specific questions at this time, but I want to say, Mr. Apgar, and perhaps you too, Mr. Buchanan, but you particularly, Mr. Apgar, when you talk about RCRA and CERCLA, we fought the fight, if you were watching the proceedings on CERCLA, on how clean was clean. We tried to make the argument that some sites were in situations or areas where there was no great danger or threat to the human health or the environment that required a complete cleanup. Yet, we lost that fight on how clean was clean.

I would hope, and I think you could make a great contribution when we start the hearings on reauthorization, with specific points if you can make them, as to where we don't have to go to that last Nth degree. Where that groundwater has no potability or use, or there are alternatives that are economically more feasible, then I would also ask and urge both of you wherever possible, as I asked the last panel, that you see Federal laws changed to achieve better coordination and consistency, that you advise us as to where we can make the changes to provide for that better coordination and consistency in dealing with groundwater.

We know that there is a lot of overlapping responsibilities. There is a lot of regulations that are probably counterproductive in solving the problem. You people are in a prime position as well as those local people that were the previous panel, to give us that consultation and advice. We welcome it.

On Superfund, you particularly, Mr. Apgar, can be extremely helpful in that debate on how clean is clean, and what is required and what is not required, and how do we better utilize our financial resources.

Mr. **Apgar**. Thank you, I will try to do that.

I would like to make one observation to an issue that came up in earlier questioning, though, on whether agricultural chemical use contaminates groundwater as a standard practice. As water people, on the one hand we could say don't contaminate the water at all, but as professionals involved in this area, we realize that there has to be a balancing of interests, and that standard agricultural practice and application of fertilizers and pesticides does contribute to some groundwater quality impact.

In very vulnerable areas, where the climate is humid, where the sediment is very coarse, where we are dealing with cavernous rocks, water moves very quickly without being filtered or attenuated, pesticide residues have been identified in groundwater in high concentrations.

But in most other areas, where the sediments do have some ability to retard the flow of contaminants through the ground, they are attenuated, and the concentrations are very low. In fact they usually are minuscule compared to the concentrations that occur in surface as a result of runoff from fields.

There is a tendency, though, to say that we can somehow obviate the need for pesticides by producing pest-free crops. That has been tried, certainly, there are people breeding crops that are going to be less attractive for one reason or another, to pests. But when they do that, the crops themselves usually turn out to be more toxic to people as well as more toxic or more unattractive to the pests that we are trying to prevent.

Saying that we are going to grow crops that bugs don't want to eat is not necessarily going to be a solution that results in reduced need for or elimination of pesticides.

Mr. STANGELAND. If the bugs don't want them, we may not want them either, is that it?

Mr. NOWAK. Let's turn to Mr. Grant from Florida.

Mr. GRANT. Thank you, Mr. Chairman. Mr. Apgar, you stated that indeed at most waste sites, the estimated cancer risks are generally less than that of chlorinated surface waters being the requirements of the Safe Drinking Water Act. Do you have data to substantiate that?

Mr. APGAR. What I am doing is using the fact that surface waters that are disinfected with chlorine as a standard practice often have trihalomethane concentrations that range somewhere between 50 and 100 micrograms per liter. In fact, 100 micrograms per liter is now the acceptable level as an average annual in treated public water supplies, although there is a look at trying to reduce that certainly, and it is controversial.

The solvents that are the most common contaminants in groundwater at waste disposal sites rarely exceed those concentrations or risk levels. In fact the common solvents such as trichlorethylene, tetrachloroethylene, that are thought to be carcinogenic to humans, are on a risk basis at least not thought to be any more carcinogenic than the trihalomethanes that result from chlorine disinfection in water.

So now another inconsistency we are dealing with is that under the Safe Drinking Water Act, standards have been set for these solvents in public water supplies, at generally five parts per billion, or close to the level of detachment. If a groundwater supply is found to contain solvents at levels exceeding five parts per billion for trichlorethylene, then the utility who is using that as a source of public water supply is told to discontinue use or treat it to remove the contaminant.

Typically what they do is go to an alternative surface water supply, where the health risk is probably in the order of magnitude higher right now, although those risks are still so low that they probably are not appreciable. The need to make that switch and incur the additional costs, and undermining the public confidence in the supply is a critical problem and an inconsistency among Federal rules right now that we have to deal with.

Mr. GRANT. So we can have safe drinking water without such strict standards, is that what you are saying?

Mr. APGAR. I don't mean to argue against standards, or even the attempt to eliminate all pollutants from water. I think that's a good idea. But I think what we need to do is be consistent. This matter of saying that the groundwater is too contaminated and too risky to use, so we will switch to something else, which has an estimated higher risk associated with it right now, is not a consistent thing to do.

Mr. GRANT. I share the Chairman's apparent frustration over some of these standard that are being used. Someone in my district told me a few weeks ago that they were being restricted to 0.13 parts per quadrillion of a certain element in their discharge. I think he told me that they could only measure seven parts per quadrillion, but they were being restricted to 0.13. I don't know how the DER in Florida or the EPA can measure that.

I was led to believe also that if a forest fire had occurred within the past two years in that particular stream area, that the natural contamination would be two or three parts per quadrillion. I guess I am a bit frustrated about your statement here about the contaminants at the waste sites being generally less than the chlorinated surface waters.

I don't know who to take it out on, I would like to take it out on you.

Mr. APGAR. We are dealing with the outer limits of what we are going to be able to know about the health effects of these toxicants, too. Obviously, they are not particularly toxic or cancer-causing because we have not seen any significant rise in age adjusted cancer rates over the last 50 years, except for those that are due to probably smoking, lung cancers, occupational exposures, maybe asbestos, or maybe sunbathing.

I think the concern about contaminants in groundwater have really caused or led to a cynicism and fatalism among most of the public that almost anything is bad for you. When we start picking on activities that have a very low risk associated with them, I think we tend to allow people to ignore what the significant risks are and ignore the choices in diet and life style that are the major contributors to cancers that we have.

Mr. GRANT. Right you are. Good point.

Mr. NOWAK. Thank you very much for your testimony. Some other questions have come up while Mr. Grant was asking his, but we will keep the record open for a period of time, because there is an awful lot of material that we try to assimilate in a very short period here. Yet I am sure it has taken a long time to become a witness.

Thank you for your patience and your testimony and we look forward to your input in the future.

Mr. APGAR. Thank you, sir.

[Mr. Buchanan's prepared statement appears on page 73.]

[Mr. Apgar's prepared statement appears on page 67.]

Mr. **Nowak**. The subcommittee will stand adjourned.

[Whereupon, at 1:56 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

PREPARED STATEMENTS OF WITNESSES

association
of ground water
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A DIVISION OF NWWA

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STATEMENT

OF

MICHAEL A. APGAR

ON BEHALF OF THE

ASSOCIATION OF GROUND WATER SCIENTISTS AND ENGINEERS

A DIVISION OF THE NATIONAL WATER WELL ASSOCIATION

6375 Riverside Dr.
Dublin, OH 43017

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

U.S. HOUSE OF REPRESENTATIVES

CONCERNING GROUND WATER QUALITY ISSUES

April 25, 1990

Good day, Mr. Chairman and members of the House Public Works and Transportation Subcommittee on Water Resources. My name is Michael A. Apgar. I am a professional hydrogeologist. I am pleased to have the opportunity to address you today on the matter of ground water quality issues on behalf of the Association of Ground Water Scientists and Engineers, a division of the National Water Well Association.

The National Water Well Association is a nonprofit trade and professional society representing all segments of the ground water industry. The Association of Ground Water Scientists and Engineers is the technical division of the National Water Well Association. Most of the country's leading ground water scientists and engineers are among its over 14,000 members. The Association publishes two of the most widely circulated technical journals, The Journal of Ground Water and Ground Water Monitoring Review, and holds nearly 80 educational programs (conferences and short courses) annually. The Association also conducts a certification program for ground water professionals.

For forty years, the National Water Well Association has promoted better understanding, wise development, protection and management of ground water. "Ground water, our most precious resource," is a slogan the Association has used for decades to help raise consciousness of and concern for ground water.

Today, ground water protection ranks among the highest of public concerns. Extensive laws and expensive programs are now in place to protect, investigate and clean up ground water. These programs have been satisfying to ground water professionals because we have become the champions of a popularly recognized cause, and they provide our rapidly growing ranks with a good livelihood.

However, as both a concerned professional scientist and a taxpaying citizen, I come before you today to exclaim that current laws and the legal and political administration of ground water contamination legislation is subverting proper scientific methodology and good engineering practice. Despite the abundance of good intentions and intelligent people, we are mired in misconceptions about ground water and encumbered with inflexible rules and bureaucratic red tape. We are not getting increased benefits for human health and the environment commensurate with current expenditures.

Ground water occurs in a variety of settings. In some areas, ground water is readily available for supply purposes; while in others, yields are too low to satisfy even individual domestic water needs. Some ground water is naturally filtered so that pathogenic organisms and other harmful chemicals are removed; while in other settings, no appreciable removal of contaminants occur. In many cases, ground water is naturally suitable for direct use without any or much treatment: while in others, the level of treatment required makes use infeasible. Some ground water flow systems are limited in extent, have ground water flow rates of many feet per day and residence times of only a few days or weeks; other ground water flow paths extend for miles, ground water flow rates may be measured in feet per year or per century and residence times may be in millenia.

The geologic formations which store and transmit water are called aquifers. Some aquifers are recharged directly from the local land surface, while others are recharged principally from remote locations and are virtually immune from local sources of contamination at the land surface.

Aquifers have several functions:

1. They maintain the fair weather flow of streams

2. They serve as sources of water supply to wells

3. They attenuate contaminants.

Often, aquifers serve more than one function within the same area. For instance, effluent from a wastewater septic system is discharged into the ground and ground water safe to drink is removed from a well in the same yard - often only 100 feet away. This example illustrates that water does not have to meet drinking water standards everywhere in an aquifer in order to be useful for drinking water purposes. In fact, the ground water needs only to meet the requirements for a particular use at the point that it is used, i.e., at a wellhead or in a receiving stream. This familiar example should also demonstrate the fallacy of adopting uniform standards for ambient ground water quality.

Nevertheless, we are spending millions of dollars on many existing and former waste sites under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to maintain or achieve drinking water standards - whether the ground water is or could conceivably be used as a source of potable water or not. In many cases, alternate water supplies have or could be provided to meet local existing or future water needs so much more efficiently than cleanup of contamination. State and local authorities governing well construction, water withdrawals and land use should be employed to augment federal authority and prevent exposure of aquifers to contaminants and people to contaminated ground water.

Every site is different and every hydrogeologic environment presents special circumstances which need to be addressed by investigation, evaluation and - if necessary - remediation. Specifying numbers of monitor wells and tests of statistical variation in ground water quality - while having some appeal for lawyers and statisticians are generally inadequate and inappropriate for determining whether and how much ground water quality is impacted and whether something needs to be done about it.

The public demand for non-degradation and/or complete cleanup of contaminated ground water is unrealistic and often unnecessary to protect human health and the environment. Laws that do not recognize this lead to much wasted expenditures. They also breed cynical disdain for the legislative process in the technical and regulated communities.

Laws which assume and enhance an adversarial relationship between regulators and the regulated - creating requirements for extensive court-ready documentation - have created massive inefficiencies. In particular, the current quality assurance/quality control (QA/QC) procedures required under CERCLA have a stifling effect on the progress of ground water studies and remediation. These QA/QC procedures are time-consuming and costly so that fewer samples are collected - often without sufficient follow-up to understand variations and trends in ground water quality. There is a need for good, accurate ground water data, and a certain level of accountability, but the current system is one of immense overkill. A reduction in QA/QC requirements is imperative to provide timely information to keep progress on track. Reduction in QA/QC must go hand in hand with policies that lessen the likelihood of trying to solve technical problems in the courts.

The establishment of legislatively mandated quotas on starting and completing investigations and remedies was apparently intended to accelerate ground water accomplishments. However, as in the case of measuring progress in war with body counts, it has led to very perverse results. Single sites are often now separated into "operable units" for purposes of meeting bean counts, reducing both efficiency and consistency in remediation decisions. Sites which are obviously not significant threats to human health or the environment are placed on the National Priorities List at least in part because they represent "magic beans" (relatively easy cases to gain credit for "solving"). Finally, in a completely twisted approach, obviously innocuous operable units of a site have been addressed first, because they are the easiest to solve, while real problems are allowed to fester!

Another grave concern is that much of our legislation has been designed to solve the wrong problems. Most laws address point source contamination from landfills and other waste management facilities. However, the most extensive threats to ground water quality come from non-point source activities such as agricultural chemicals (fertilizers, herbicides and pesticides) and with point sources such as petrochemical manufacturing plants, machine manufacturing and repair shops, dry-cleaning establishments, photo-processing shops, electronics plants, other industrial manufacturing and product storage areas, septic systems and leaks in sewer lines. In addition, most existing legislation predates our emerging understanding of the subsurface behavior of non-aqueous fluids - especially the dense, non-aqueous phase liquids such as chlorinated solvents, coal tar, creosote and PCB oils. Once in an aquifer, these materials may never be effectively removed, leaving us with options of perpetual caretakership (pump and treat), point-of-use treatment or abandonment of part of an aquifer as a source of future water supply.

The result of a decade or more of ground water legislation (RCRA and CERCLA) has been the inadvertent creation of a large number of expensive field experiments in ground water quality. From these "experiments", it can be concluded that (1) most CERCLA sites have not caused widespread contamination of major aquifers, (2) attempts at aquifer remediation where ground water contamination was severe to a state where all ground water meets drinking water standards have rarely been successful, (3) costs of aquifer restoration at CERCLA sites typically run to tens of millions of dollars, (4) new technologies for aquifer restoration will not significantly reduce costs nor provide better, permanent solutions, (5) little has been achieved in terms of reducing risks to human health or the environment from these massive expenditures. Indeed at most waste sites - including those with the most notorious cases of contaminated well water - the estimated cancer risks are generally less than that of chlorine-disinfected surface waters which meet current requirements of the Safe Drinking Water Act. Clearly, the results don't justify the means in such cases!

There is certainly a need for changes in current ground water legislation and the administration of existing laws to make them more realistic and flexible, less dependent on legal adversarial action, and less encumbered by bureaucratic red tape. We should curtail attempts at blanket cleanup of all ground water contamination and focus on protecting aquifers that constitute valuable sources of water supply or surface ecosystems and remediate only those sites where significant benefits can be achieved. More emphasis should be placed on proper siting and management of wastes and products which threaten ground water to prevent serious future ground water contamination problems.

These lessons must be absorbed by the public so that they will appreciate and support new improved legislation. Unfortunately, it seems from the widespread, near-hysteria about ground water quality and toxic wastes that these lessons have not been widely accepted and ground water issues not sufficiently understood. Therefore, until the political climate allows a more rational approach, we advise against additional federal ground water legislation.

Thank you again for the opportunity to comment. I would be pleased to answer any questions you may have or have the Association of Ground Water Scientists and Engineers furnish additional information.

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TESTIMONY

on

Protection of Groundwater Quality

before the

Water Resources Subcommittee of the

Public Works & Transportation Committee

U. S. House of Representatives

on

April 25, 1990

Presented by

Thomas J. Buchanan

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American Water Works Association
testimony on
Protection of Groundwater Quality

before a hearing of the
Water & Resources Subcommittee,
Public Works & Transportation Committee
U. S. House of Representatives
April 25, 1990

by
Thomas J. Buchanan
CH2M Hill, Inc.
P. O. Box 4400
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Good morning. I'm Tom Buchanan, a member of the Consulting firm of CH2M Hill, here today representing the American Water Works Association (AWWA) as part of that organization's special Technical Advisory Work Group on Groundwater Protection.

The AWWA appreciates this opportunity to be a part of the subcommittee's deliberations on groundwater quality issues. The AWWA is a 109-year-old scientific and educational association that is the largest association of professional drinking water people in the world. We have some 50,000 members that include utility operators, engineers, scientists, professors, health regulators, environmentalists, and many others that have a genuine interest in drinking water. Our membership also includes roughly 3,500 utilities that supply about 75% of the nation's drinking water.

I am particularly delighted to be here today because I spent a major part of my life dealing with groundwater issues with the United States Geological Survey (USGS) retiring in 1986. I have also spent many years of active involvement with groundwater issues with AWWA and see a great deal of groundwater concerns in my current role with CH2M Hill, one of the Nation's leading consultants on environmental matters.

As you know, groundwater quality issues are extremely complex and impact a wide spectrum of interested parties. The AWWA has a particular interest in legislative initiatives to protect groundwater quality because of our role in providing safe drinking water to the public that we, and you serve.

In the last few years many bills relating to groundwater have been introduced in Congress. Although we feel that federal legislation is needed, no bill has yet contained all of the provisions AWWA would like to see in groundwater protection legislation. My statement today represents a series of concepts supported by AWWA concerning the protection of groundwater quality. Many of these concepts you are already familiar with from pending legislation. Nevertheless, we appreciate this opportunity to emphasize again their importance.

1. Groundwater Quality must be Protected.

Groundwater resources must be managed and protected to ensure optimal production of water of the best attainable quality and quantity for present and future generations.

A primary concern of AWWA is the protection of groundwater resources which now, or in the future, may serve as a source of public, private, or industrial supply. Achieving AWWA's principal objective, to provide drinking water of unquestioned quality, requires keeping source waters clean. Groundwater is vulnerable to contamination from diverse sources including, but not limited to: hazardous waste disposal, accidental leaks and spills, residential septic tanks, agricultural applications of fertilizers and pesticides, leaking underground storage tanks, highway de-icing salts and other industrial and nonpoint source discharges.

2. State and Local Role is Critical.

State and local governments should have the primary responsibility for the management of groundwater resources because groundwater quality and usage varies dramatically across the country.

State and local governments can best assess local economic, social, and environmental impacts of groundwater management policies. State and local governments have the best knowledge of site-specific technical issues. Also, state and local governments are in the best position to implement protection programs in view of their traditional roles in regulating land use. The AWWA recognizes that some instances exist where interstate conflicts can occur regarding groundwater (e.g., aquifer contamination, aquifer depletion, and aquifer recharge), however, these conflicts seldom involve more than two neighboring states and should be resolved at the state level.

An all encompassing program for groundwater management at the federal level would be prohibitively expensive and a questionable use of resources in view of the limited federal budget. In addition, a cumbersome federal program is unlikely to succeed in its objectives without significant and duplicative state and local effort given the location specific complexities of groundwater, both technical and political.

3. A Strong, Supportive Federal Role is Essential.

Federal involvement in the management and protection of groundwater is needed to support state and local goverments.

Technical guidance, seed funding of state programs, and research programs are needed at the federal level. Oversight of state and local programs should be provided, for example, by defining minimum elements of a comprehensive state program, and developing flexible state program approval/disapproval criteria that are performance oriented. Strong emphasis should be given to providing financial and other incentives to states that have comprehensive programs. The federal government should not step in to take over where a state is not performing, but should do all it can to provide real incentives that compel the states to develop sound programs. The federal government with the assistance of the impacted state, should also take the lead role in resolving international groundwater issues that arise with Mexico and Canada.

4. Drinking Water Sources Must Be Protected.

The most important use of groundwater is as a source of drinking water. All groundwater resources for drinking water supply must be given special attention.

An aquifer's quality should be protected based on drinking water standards, unless the aquifer is naturally or irreversibly contaminated. For groundwater aquifers that cannot reasonably be expected to ever be used as a drinking water source, state and local governments should be allowed to develop alternative standards on a case-by-case basis to meet regional and local needs. However, alternative standards must not result in contamination of potential sources of drinking water.

In the case of artificial recharge, existing drinking water standards may not be adequate to ensure aquifer protection. Recharge waters may contain unacceptable levels of unregulated contaminants, yet, meet the drinking water standards at the same time. Recharge water should be scientifically assessed to assure that any risk to the public is minimized. Quality standards for recharge waters must weigh several factors including health risks and benefits, existing aquifer water quality, designated use of the aquifer and treatment costs before recharge.

5. The Primary Protection Strategy must be Pollution Prevention.

Federal, state and local efforts should focus on groundwater pollution prevention.

Sources of contamination that degrade groundwater quality must be identified, regulated, and eliminated where feasible. Best technologies and management practices should be used to protect groundwater to the maximum extent practicable. Contamination should be prevented whenever possible.

Detection of a contaminant in an aquifer that serves as a source of drinking water should trigger some minimal pollution prevention action. Detection of a percentage of the drinking water standard for a contaminant should initiate more severe pollution prevention activities. In no case should a contaminant concentration be allowed to exceed drinking water standards in an aquifer that serves or could serve as a source of drinking water.

6. Groundwater Quantity Impacts Quality.

Groundwater quantity issues are an important concern in formulating a national groundwater quality protection strategy.

Groundwater withdrawals impact groundwater quality and states must have control over withdrawal issues. Control of withdrawals from groundwater sources should be based on knowledge of aquifer capabilities. Withdrawals of groundwater to levels of near depletion should be eliminated. The AWWA supports artifical recharge as an increasingly important technology for sustaining groundwater supplies in areas where groundwater depletion is occurring. The AWWA also recommends that all withdrawal of groundwater be metered and controlled in critical areas in order to prevent aquifer depletion. Conservation measures should be implemented and enforced in these areas.

7. Remediation of Contamination in Aquifers Serving as Public Water Supply Sources should Receive High Priority.

The clean-up of contaminated aquifers that are the only reasonable source of drinking water for human consumption must be included in any groundwater protection policy.

Drinking water standards should be established as the clean-up level in remediation programs on a national basis, with authority given to state governments to establish different levels (higher or lower) on a case-by-case basis depending on public health considerations and then other factors such as likelihood of potential use, cost, technological practicality, negative environmental factors. Arbitrary imposition of standards more stringent than drinking water regulations not only errodes the stature and value of drinking water standards, but also imposes a burden on water utilities trying to comply with unnecessarily restrictive standards. Assurance that public health is protected should be proven on a case-by-case basis if

levels differing from drinking water standards are allowed by the state.

Any program established to remedy groundwater contamination must be based on sufficient technical understanding of the resource itself, the availability of other sources of potable drinking water to users, and the economic and technological practicalities of restoring the resource. The federal and state governments must increase efforts to find technological solutions to restoring groundwater quantity and quality. Continuing effort is needed by state or local health agencies to test residential well water supplies where contamination is suspected.

8. Existing Laws must be Funded.

Funding for groundwater programs authorized by existing laws needs to be appropriated.

Existing federal legislation attempts to protect public health and the environment from toxic contaminants. As this committee knows, authorized programs mandated in existing laws often suffer from a lack of federal funding.

For example, significant additional funding and federal activity is needed in the wellhead protection program established under the Safe Drinking Water Act (SDWA) 1986 amendments. AWWA supports this program and would like to see effective wellhead protection programs developed in all 50 states. Groundwater related provisions are included in many laws, including the SDWA, the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Resource Conservation and Recovery Act (RCRA), and others. Groundwater protection provisions of these laws should be fully funded and implemented to the extent necessary to have effective programs.

9. Federal Agency Programs must be Coordinated.

AWWA urges Congress to clearly identify the roles of all federal agencies involved in groundwater issues.

A clearly defined agenda will reduce duplication of effort and lack of coordination in federal groundwater programs resulting in better allocation of scarce resources. We cannot afford to put critical groundwater resources in jeopardy because of duplication of effort or lack of coordination.

10. Federal Technical Assistance is Needed.

Increases and reallocation of existing technical and fiscal resources at all levels of the government is urgently needed to

ensure implementation of groundwater protection policies and strategies.

A large increase for research efforts associated with the protection, monitoring, treatment, remediation and restoration of groundwater resources is critical. This will require coordination of research efforts among different levels of government. The U.S. Environmental Protection Agency (USEPA) and the U.S. Geological Survey (USGS) have a major role in assessing the status of groundwater quality and quantity. The U.S. Department of Agriculture, along with other agencies also have an important role. Adequate Federal funds must be provided for continuing research, study and technical information dissemination.

11. Federal Legislation is Needed.

Federal legislation is needed to increase research funding, to develop training and guidance programs for states, to develop a centralized source of groundwater information, to develop groundwater standards, to clean-up critical aquifers for potable water, and to encourage and monitor state groundwater management programs.

Summary

Groundwater is an important resource that must be protected. State and local governments should have the primary role in developing and implementing groundwater management programs. A strong, supportive federal role is needed if state and local programs are to be effective.

Federal, state, and local efforts should focus on contamination prevention, with groundwater resources for drinking water supply receiving special attention. Groundwater protection policy must consider quantity and quality issues, as well as the clean-up of contaminated aquifers that are the only reasonable source of drinking water.

Existing laws that relate to groundwater protection should be enforced and implemented. Increases and reallocation of existing technical and fiscal resources is needed to ensure implementation of groundwater protection policies and strategies. Coordination of federal agency programs is needed to avoid duplication of effort.

The AWWA and I appreciate this opportunity to testify today. We welcome your questions and comments.

Testimony of Roland D. Hauck, Senior Scientist
National Fertilizer & Environmental Research Center
Tennessee Valley Authority
Before the
Public Works and Transportation Water Resources Subcommittee
U.S. House of Representatives
April 25, 1990

Mr. Chairman, I welcome the opportunity to appear before the Water Resources Subcommittee today. I represent the National Fertilizer & Environmental Research Center, which is part of the Tennessee Valley Authority (TVA) and is located at Muscle Shoals, Alabama. The Center has evolved in response to public need from the initial charge to TVA by Congress to develop, demonstrate, and transfer fertilizer technology to benefit the Nation in agriculture and national defense.

TVA has been true to this charge for more than 50 years by developing new products, improved manufacturing processes, and efficient nutrient-related crop production practices. Through a variety of multidisciplinary activities at its research and development center and its nationwide demonstration and technology transfer programs, TVA has made significant contributions to farmers and farm communities and to consumers of agricultural products. Technology development and agronomic research continues to be directed at efficient use of plant nutrients, a key to farm profitability and environmental protection.

Surface and ground water protection and energy and resource conservation are central to all activities within the National Fertilizer & Environmental Research Center (NFERC). The Center is uniquely qualified to complement state and other Federal water-quality programs through its established record of cooperative effort with land-grant universities, the agribusiness community, and other public organizations. Through this network of cooperators, NFERC continues its contribution to the sustainability of U.S. agriculture and, in addition, pursues innovative ways to conserve natural resources and alleviate environmental stress.

Major NFERC program activities related to water quality issues include: (i) nutrient-related technology development, evaluation, demonstration, and transfer; (ii) waste minimization, conversion, or disposal; and (iii) information, education, and technical assistance. These activities address both point and nonpoint sources of water contamination. A typical project may involve agronomists; analytical, inorganic, and organic chemists; chemical and civil engineers; economists; librarians; microbiologists; and soil scientists, working together as a matrix-managed group.

A brief summary of selected projects follows. Additional detail is given in the addendum to my oral testimony.

Agronomic Research and Demonstration

Agricultural research is conducted at Muscle Shoals using our laboratory and greenhouse facilities and cooperatively with land-grant universities. Cooperative projects are planned and conducted jointly by university and NFERC scientists and are supported on a matching-fund basis. Coordinated experiments in several states often address specific nutrient-related, environmentally sensitive issues, for example, the ability of cover crops to prevent leaching of nitrate nitrogen during the fall, winter, and early spring or the evaluation of soil tests for nitrogen.

NFERC staff have successfully coordinated regional and national research on several clearly defined, nutrient-related, environmentally sensitive questions. We would welcome the opportunity to work with the U.S. Environmental Protection Agency (EPA) and individual states to coordinate regional research using Clean Water Act Section 319(h) funds to better define and implement their ground-water protection strategies.

Chemical, Biochemical, and Engineering Research

Virtually all of this research is directed toward economically and environmentally sound product development and waste management from agribusiness, including farming. Use of constructed wetlands for disposal of contaminated wastewaters from fertilizer dealer sites is included among novel approaches under development. Such technology would permit the flow of wastewaters after treatment in constructed wetlands into natural wetlands or filter strips on adjacent farms.

Information, Education, and Technology Transfer

We believe that the agrichemical dealer is an important avenue to farmer education on best practices for use of crop protection chemicals and plant nutrients. NFERC stands ready to work with industry, the land-grant universities, state governments, the Extension Service, and USDA in a coordinated dealer/farmer educational program.

A major NFERC effort is directed toward developing and introducing improved technical and management practices for the fertilizer dealer. This will enable the dealer to remain in business while complying with environmental protection requirements, thereby ensuring the Nation's farmers of a reliable off-farm input system.

The NFERC Perspective

In conclusion, the National Fertilizer & Environmental Research Center of the Tennessee Valley Authority is dedicated to maintaining the sustainability of U.S. agriculture, i.e., to contribute to the continual evolution of an agriculture that is productive and profitable over time, environmentally sound, socially and politically acceptable, and stewardship-minded, conserving of natural resources. This is to be done in concert with public and private sector programs also dedicated to this end.

ADDENDUM

Since its creation by the Congress in 1933, the Tennessee Valley Authority (TVA) has developed new fertilizer products and improved manufacturing processes and introduced that technology to the Nation. This technology, along with significant advances in agronomic research and fertility-related crop production practices, played a major role in making U.S. farmers the world's most efficient producers of food and fiber.

TVA's work is conducted in cooperation with farmers, the land-grant universities, the fertilizer industry, and other state and Federal organizations. This national effort is headquartered at TVA's National Fertilizer & Environmental Research Center (NFERC) in Muscle Shoals, Alabama.

Throughout its history, NFERC has made significant contributions to the Nation's agriculture and consumers. About 75 percent of the fertilizer produced in the United States today can be considered the result of TVA research and development efforts. Since the creation of TVA, its fertilizer-related programs have targeted national needs. Activities have been adjusted over time to meet changing national priorities and to anticipate future issues and concerns. Improved nutrient use efficiency and other environmentally related research has been conducted for more than 25 years and continues to keep pace with a changing agriculture. For example, a major project was begun in 1961 on the efficient and environmentally sound use of nitrogen. The project, entitled "Fertilizer Use and Water Quality," was made in cooperation with the U.S. Departments of Energy and Agriculture. It used sophisticated nitrogen tracer techniques and extended over 19 states.

The need to sustain a productive and profitable agriculture while preserving the quality of the Nation's water resources has caused NFERC to respond with changes in program emphasis. The emphasis is on helping the Nation to address water quality issues and to prevent and solve agriculturally related environmental problems, especially in those sectors of the agribusiness community where NFERC is uniquely qualified to help.

Agriculture and Water Quality Program

NFERC programs directly related to water quality issues include nutrient-related technology research and development; development of processes for waste minimization, containment, and treatment/purification; and technology transfer through the gathering and dissemination of information, education, demonstration, and technical assistance.

Research and Development

Agricultural--This research is conducted in-house and cooperatively with land-grant universities, using both university and NFERC scientists. Monies for cooperative research are not grants-in-aid but are disbursed on a matching-fund basis, allowing mutual leveraging of state and Federal monies. USDA/ARS staff located at a cooperating university participate on project teams. Currently, the Agricultural Research Department of NFERC has 32 nutrient-related projects in 22 states.

Research topics include: refining nitrogen fertilizer rate recommendations, the release and plant uptake of nitrogen from legumes and animal manures, evaluation of slow-release nitrogen fertilizers and nitrification inhibitors from an environmental protection point of view, and other practices that should increase uptake and use of both residual and applied nitrogen.

The cooperative research permits NFERC use of the knowledge, skills, and facilities of university and USDA/ARS personnel and incorporates regional soil, climate, and crop management variables into the studies. In turn, university personnel have access to NFERC facilities and special instrumentation. The system lends itself to the development of regional projects. For example, a multiyear systems management evaluation is being conducted with the University of Tennessee, components of which, in cooperation with NFERC staff, are simultaneously being studied in Alabama, Georgia, Minnesota, Nebraska, South Carolina, and Virginia. Among the questions being asked is how well does either a leguminous or nonleguminous cover crop planted in the fall intercept and prevent leaching of nitrate. All of these studies use a nonradioactive nitrogen tracer to follow the movement of nitrogen in the plant-soil-water system. NFERC has developed many methodologies for use of nitrogen tracers, and many of the Nation's agricultural scientists using these methodologies were trained as a direct result of the cooperative nitrogen research program.

Evaluation of soil tests for nitrogen is being done cooperatively with scientists in Alabama, Kansas, Maryland, Minnesota, Pennsylvania, Vermont, and Wisconsin. Indeed, it may be correctly surmised that a Midwest regional project concerned with evaluating soil tests for nitrogen is the direct outgrowth of a nitrogen test workshop organized by NFERC staff.

We believe that the NFERC administrative structure and network of contacts facilitates our ability to coordinate regional and national research on clearly identified, nutrient-related, environmentally sensitive questions.

Chemical and Biochemical--Virtually all of this research is directed toward economically and environmentally sound product development and waste management from agribusiness, including farming. However, municipalities and other industries could benefit from the research developments. Projects include removal of heavy metals from fertilizer raw materials; development of polymer-coated fertilizers; conversion of wastes to fuels, fertilizers, and specialty chemicals; and development of site remediation technologies, with emphasis on agrichemical-contaminated sites. Supercritical fluid extraction, microbial methods, and low-cost adsorbents are being studied on a laboratory scale for cleanup of waste streams and contaminated sites. Solvent extraction and selective precipitation techniques are used to study the removal of heavy metals from phosphoric acid.

Chemical Engineering--Chemical engineering activities involve evaluation and/or scaleup of: (1) innovative containment designs and materials of construction; (2) promising waste treatment technologies; (3) types of pumps, valves, conveyances, and storage and collection systems, as well as control systems for handling effluents (rinsates, spillage, and rainwater); and (4) instrumentation to (a) monitor and control volume of effluent in containment basins, (b) monitor groundwater at and around facilities, and (c) alert personnel when tanks rupture or intrusion occurs.

Sampling and Analytical Methodology--Sampling protocols have been adopted, but some may need to be evaluated and, if necessary, refined to meet stringent standards to ensure obtaining representative samples. Analytical methods that have not been validated by the Association of Official Agricultural Chemists should be guided through this process. NFERC will provide leadership in obtaining acceptance of the proper protocols.

Technology Transfer and Technical Assistance

Containment and Compliance

Model Containment Demonstrations--This function concerns fluid and solid fertilizer facilities located throughout the United States. About 20 model compliance demonstrations are being established across the Nation to demonstrate environmentally acceptable methods of containing fertilizer and fertilizer-pesticide mixtures within plant boundaries. This will demonstrate state-of-the-art technologies to both public and private sectors. The demonstration facilities show other dealers the kinds of facilities needed to comply with existing and anticipated regulations. The cost of establishing a model containment demonstration is shared by TVA and the dealer, with the construction cost being borne by the dealer. The goal is to introduce cost-effective ways to prevent contamination of water supplies.

Individual site selection is made by a group composed of state fertilizer and agrichemical trade associations, individual dealers, the NFERC regional manager, and the environmental program staff in Muscle Shoals. In some instances, National Fertilizer Solutions Association, The Fertilizer Institute, Potash & Phosphate Institute, and the state regulatory officials also have input. We are also encouraging cooperation with USDA, EPA, and USGS.

Environmental Site Assessments--Because the number of model demonstration sites is limited, NFERC is conducting either environmental or containment-type assessments of fertilizer facilities across the United States. For a fee, NFERC assessors tour the plant and describe to the owner/operator the type of containment facilities that should be installed and provides generic drawings of the type of containment recommended. In addition, a report is sent to the dealer confirming what was described verbally during the tour. At the dealer's discretion, and for an additional fee, site-specific drawings of any or all portions of the containment facilities can be provided.

Constructed Wetlands--Constructed wetlands, sometimes called artificial or designer wetlands, are being used in treating municipal and mining wastes. There is little experience within or outside of TVA on using this technology for disposal of industrial wastes. Disposal of wastewaters, rinsates, or storm waters contaminated with fertilizers and crop protection chemicals is becoming increasing more difficult for agrichemical dealers. Some of the wastewater can be disposed of through field application or used as formulation water. Often, however, storage is required until the water can be hauled or pumped to an acceptable disposal site. Basic research, large-scale applied research, and demonstrations are being conducted at Muscle Shoals to develop a relatively low-cost, easy-to-maintain constructed wetlands technology for use at dealer sites and by others. Pending successful demonstration at the Muscle Shoals prototype fertilizer plant facilities, NFERC staff plan to evaluate and demonstrate this technology in different regions of the United States.

Information and Education

Information System--For Federal agricultural programs to be in concert with those of states, continual awareness of state activities regarding agriculture and water quality is a necessity. NFERC is establishing a state legislative data base which we will seek to pool with related information to be collected by the National Agricultural Library. Knowledge of existing and proposed environmental legislation; continual update of the implementing regulations, rules, and guidelines; and nutrient-related environmental research activities is central to establishing and maintaining NFERC's environmental programs. Information obtained from a variety of sources will be used to create and maintain a computerized text data base for use within NFERC. Information will be maintained in a format that will allow transfer to a large microcomputer system for subsequent use by TVA and others. The system will permit analysis of legislation, e.g., identifying commonality of approaches to a particular environmental problem and observing state, national, and international trends. The system, at maturity, will provide up-to-date general and specific information useful to TVA, other governmental organizations, legislatures, industry, and public interest groups.

Dealers often are the last persons contacted before application of these off-farm inputs. Dealers need to be educated about the wise use of the products that they sell and be assisted in disseminating this information to their farmer-customers. NFERC efforts in this area are being intensified and have industry support. An extensive effort is needed to which NFERC can make valuable contributions.

Assuring a dependable distribution of off-farm inputs is vital to the sustainability of U.S. agriculture. Therefore, a major effort is being made by NFERC to develop and introduce improved technical and management practices for the fertilizer dealer. This will enable the dealer to remain in business while complying with environmental protection requirements. Included among the several features of this program are the environmental site assessments and model full-facility containment demonstrations already discussed, efforts to develop a dealer information network, helping farmers to practice environmental stewardship, helping dealers work with regulatory agencies and the public, and related activities.

Educational Materials--A variety of reports, operational manuals, video tapes, slide sets, and other educational materials are being developed. This effort is essential to support dealer education, technology transfer, research, compliance demonstrations, and reporting of research results in lay terms. Educational materials will benefit the entire environmental effort by helping to effectively communicate NFERC's research results and to transfer technical assistance expertise to user organizations. Staff will provide educational tools as strategies to help fertilizer dealers promote use of improved management practices with farmer-customers.

Conferences and Workshops--NFERC is organizing and cosponsoring regional and national conferences and workshops to meet the following objectives: (1) create awareness among representatives of specific public or private sector groups about particular nutrient-related environmental issues, (2) have a voice in regional and national meetings that could impact major decisions affecting agriculture, (3) direct the flow of reliable information about nutrient-related environmental issues to private and public sector groups targeted to receive such information, and (4) bring together groups differing in their views about national approaches to solving problems related to agriculture and the environment.

Special Projects

Recently, NFERC has identified several areas of work that will be intensified. These areas are of national significance from an environmental and resource perspective. Following is a brief description of these special projects. Two of them--Constructed Wetlands and Improved Management Practices for Fertilizer Dealers--already have been described. The others are:

Municipal Solid Waste (MSW)--Emphasis in this area is on developing technology to convert the cellulosic fraction of municipal solid waste and other wastes to fuel ethanol, furfural, acetic acid, and boiler fuel. Our role is to determine the potential of using our ethanol-from-hardwood technology in MSW. The overall goal of the project is to develop the technology and design information for an integrated MSW processing plant involving recycling, ethanol production, chemical production, and production of electricity.

Improved Utilization of Poultry-Animal Wastes--Poultry and livestock production are major enterprises in the Southeast and elsewhere. A growing environmental problem is the lack of viable disposal alternatives for the large quantities of waste generated. NFERC is investigating problems and opportunities associated with broiler litter. Initial efforts involve evaluating acid hydrolysis to produce sugar for ethanol production, and developing and introducing the technology.

Remediation and Disposal Technologies for the Dealer--There are 14,000 fertilizer dealers in the United States. More than 3,000 custom mix and apply pesticide formulations. NFERC is introducing technologies to help fertilizer dealers handle fertilizer and agricultural chemical wastes in an environmentally sound way. As wastes and spills are contained, there will be increased need for technologies to treat the portion that defies recycling. Contaminated soils pose serious environmental risk. Project objectives are to identify, evaluate, research, develop, introduce, and market waste treatment and site remediation technologies and strategies for use by fertilizer dealers and others.

Optimizing Nitrate/Ammonium Nutrition--Research suggests that some plant genotypes respond with increased yield when the ratio of ammonium to nitrate nitrogen is adjusted during the growing season. Adverse environmental effects of nitrogen fertilizer use might also be reduced as a result of the improved efficiency of use. Current NFERC research in this area is being intensified to provide a strong biochemical and plant physiological basis for future investigations.

Use of Polymers for Improved Iron Fertilizers--Iron chlorosis affects many crops, especially on calcareous soils. Significant land areas west of the Mississippi River and around the world differ in available iron content. There are no effective, economical iron fertilizers to correct iron chlorosis for most crops. This project will investigate the use of polymers as a matrix for iron fertilizers to improve the efficiency of the applied iron. The project will build on recent greenhouse results that show promise.

Use of Industrial Wastes/By-products in Fertilizers--This project is to identify the major sources of industrial wastes and by-products that have potential use as fertilizers and the technology for their environmentally and economically sound use in fertilizer. The goals are to develop and introduce technology to reduce waste handling costs and to convert potentially hazardous wastes into useful by-products. The second phase of this project is to find uses or remediation methods for NFERC's elemental phosphorus wastes.

Innovative Processes for the Manufacture of Organic Nitrogen Compounds--The object of this project is to develop less energy-intensive methods for the production of one or more basic nitrogen fertilizer chemicals. If successful, this project could lower the costs of these materials, and subsequent savings will be realized for all fertilizer formulations of which these materials would be a part.

Collaboration

The NFERC seeks to expand and strengthen its relationships with both the public and private sectors interested in or impacting environmental and regulatory issues. Encouraging others to participate in or cosponsor NFERC environmental activities is a major program goal. Industry and trade associations; public interest groups; and government agencies, such as EPA, USDA, and USGS, are being encouraged to participate. Local, state, and Federal organizations, along with environmental groups, are being encouraged to consider TVA/NFERC input in their programs. The idea is to prevent duplication and to increase benefits to the Nation in terms of protecting the environment.

NFERC agricultural research frequently interfaces with USDA/ARS and CSRS activities on both the planning and action levels. Recently, NFERC became a participating member of the Technical Integration Group (USDA, EPA, USGS, and others) that was formed in response to the President's Water Quality Initiative. NFERC also participates on the Ground Water Quality Subcommittee, Committee on Earth Sciences, Federal Coordinating Council on Science, Engineering, and Technology. Because of its network of contacts and service on committees of land-grant universities, state governments, and agribusinesses, NFERC contributes to the total agricultural perspective of these interagency groups.

The challenge of maintaining a sustainable agriculture in a quality environment is great; it will require the cooperative efforts of public and private organizations on the local, state, and national levels. NFERC staff is committed to such collaborative effort.

STATEMENT ON THE
MINNESOTA GROUND WATER PROTECTION ACT OF 1989

BY

PATRICIA JENSEN
EXECUTIVE DIRECTOR
MINNESOTA LEGISLATIVE WATER COMMISSION

BEFORE THE
U.S. HOUSE SUBCOMMITTEE ON
WATER RESOURCES

April 25, 1990
Washington, DC

Chairman Nowak and members of the subcommittee, my name is Patricia Jensen and I am Executive Director of Minnesota's Legislative Water Commission. The purpose of my testimony today is to discuss the state's new groundwater protection act and its relationship to the state's reliance on groundwater.

The Minnesota Groundwater Protection Act of 1989

In May 1989, the Minnesota Legislature passed and the Governor signed into law the Minnesota Groundwater Protection Act, Laws of Minnesota, 1989, Chapter 326. This law established a framework for the protection of Minnesota's groundwater. The framework centers around a state goal of preventing the degradation of our groundwater. It also defines the procedures for promoting and then requiring the use of good management practices to keep pollutants out of the groundwater. It is important to remember that this new framework complements the existing mixture of laws, regulations and programs.

State Reliance on Groundwater

Minnesota's groundwater is a valuable yet vulnerable resource which has gained increased attention over the past several years. We rely on it as a safe source of drinking water for two of every three Minnesotans. In addition, it is a critical component in many industrial processes and to the agricultural industry of the state.

In spite of the historically clean and abundant groundwater, we are finding evidence of past neglect and abuse. Current indications are that while a relatively small percentage of available groundwater has been degraded, incidents of contamination are widespread and there is a continuing supply of new sites which are discovered and investigated through the state and federal Superfund programs.

Reliance on groundwater has increased dramatically in the past decade. In 1976, groundwater was 14 percent of the total water withdrawn. Currently, that figure is closer to 25 percent. Generally, this water use is in the categories of public water supply, rural domestic and livestock use and irrigation, and self-supplied industrial use. Public water supplies and irrigation together account for more than 50% of the groundwater use in Minnesota. Despite the generally positive picture of supply and demand, there are localized shortages due to well interference or contamination, and major unpredictable events such as drought conditions.

In addition to more than 1,400 active and closed land disposal sites, there are an estimated 300,000 individual septic systems plus an additional number of larger drainfields and land application systems serving municipalities and industries. A third of a million tons of sewage sludge is spread at 1,000 sites across the state. Nonpoint source run-off has been identified as a contributor of bacteria and nutrients as it either infiltrates or enters the groundwater through wells no longer in use.

There are an estimated 60,000 underground bulk storage sites in Minnesota. Leakage from the underground storage of liquids, most petroleum products, is estimated to be occurring in 10-25 percent of all underground tanks. There are currently from 600-800 active sites in the state being investigated for cleanup under the combined state and federal underground storage tank and petroleum cleanup fund programs.

Currently there are 165 sites identified on the Minnesota Pollution Control Agency's State Superfund priorities list, including 57 landfills. The majority of these sites involve groundwater contamination by organic solvents.

The Groundwater Bill

With public input, the state agencies involved with the water program proposed to Governor Perpich a comprehensive groundwater bill. Differing versions of the legislation worked their way through both bodies of the Minnesota Legislature, resulting in many long hours of hearings and testimony.

The New Law

The groundwater law which passed establishes landmark water policies in several areas. The cornerstone of the law is the degradation prevention goal. In the past, the Minnesota Pollution Control Agency operated with regulations that stated a nondegradation policy, but groundwater protection strategy pointed out the need to extend this policy to all state programs with the endorsement of the Minnesota Legislature. The law begins with the following statement:

> It is the goal of the state that groundwater be maintained in its natural condition, free from any degradation caused by human activities. It is recognized that for some human activities this degradation prevention goal cannot be practicably achieved. However, it is intended that it be achieved. Where it is not currently practicable, the development of methods and technology that will make prevention practicable is encouraged.

The bill was divided into ten articles which were inserted into existing law. A significant amount of the language deals with pesticide and fertilizer programs because the legislators felt this area of regulation needed to be greatly expanded to provide adequate controls on fertilizer and pesticide application.

Well construction and well protection were also significantly addressed in order to improve regulatory systems administered by the Department of Health. Drinking water safety and groundwater protection were the goals of these sections.

For non-point pollution, the thrust of the new law is toward protection of groundwater through voluntary means.

When water quality has been degraded, best management practices will be used to improve the situation. It is only after they are proven ineffective that more stringent regulation is employed.

Following is a synopsis of the major policy elements of the Groundwater Protection Act.

* The Minnesota Groundwater Protection Act of 1989 establishes a sensible policy framework for groundwater protection that:
    - sets a state goal of keeping our groundwater free of pollution;
    - addresses the special needs of areas of the state sensitive to contamination; and
    - combines education, research and regulations to prevent further contamination of groundwater, dividing responsibilities between the Department of Agriculture for fertilizers and pesticides and the Minnesota Pollution Control Agency for all other pollutants.

Specifically,

* It directs the Department of Health to establish Health Risk Limits for toxicants for which there is no federal drinking water limit.

* It provides, for the first time, a system to track construction and abandonment of wells, and provides for a pilot well-sealing grant program.

* It provides the state money for monitoring of public drinking water supplies as required under the Safe Drinking Water Act.

* It bans the use of new once-through cooling systems, and assesses a fee on existing systems.

* It provides the authorities and staff needed by the Minnesota Department of Agriculture to reduce contamination of groundwater from fertilizers and pesticides.

* It establishes a nitrogen study task force to review existing research and to develop recommendations for a nitrogen fertilizer management plan for the prevention, evaluation and mitigation of nonpoint source occurrences of nitrogen fertilizers in state waters.

* It accelerates efforts to promote alternatives to chemicals based upon the concepts of sustainable agriculture and integrated pest management. State agencies are directed to use integrated pest management in the management of state lands.

* It establishes a new agricultural chemical response and reimbursment account.

* It provides equal access to state Superfund dollars to both the Minnesota Department of Agriculture and the Pollution Control Agency.

* It establishes a pilot pesticides pickup program and bans nonreturnable pesticide containers by July 1, 1994, to help keep from generating new pesticide wastes in the future.

* It provides for state grants to counties for completing and carrying out local plans to protect groundwater.

* It accelerates research on the senitivity of groundwater to contamination through the development of regional geologic assessments and county geologic atlases.

* It calls for the coordination and integration of water data through the State Planning Agency and provides state funding for the MPCa's Integrated Groundwater Information System which is being developed under Federal 106 grant money.

* It charges the Environmental Quality Board and a new Legislative Water Commission with responsbility for coordinating and monitoring implementation of the legislation.

Finally, the law provides a balance in funding between the General Fund ($8.3 million) and fees (between $8.1 and $8.7 million) with each contributing about half of the $16.4 to $17 million authorized.

The Environmental Quality Board's advisory committee recommended that the funding be taken out of the General Fund because all citizens of the state benefit from clean water. However, because of a limitation on the amount of money in the General Fund, fees were often identified as an alternative source of funding. For example, fees were assessed on the use of groundwater in once-through cooling, for well construction and monitoring, and on the registration of agricultural chemicals and licensing of facilities, dealers and applicators. This funding mechanism had the support of Minnesota's agricultural community.

It has been several months since the groundwater bill became law. Implementation has proceeded, for the most part, in a timely fashion. This is a credit to all who worked for its passage: the state agencies, the agricultural community, environmentalists, and citizens who attended the many public hearings.

Thank you Mr. Chairman, for the opportunity to present Minnesota's new water law. We at the Legislative Water Commission will be measuring future progress of this landmark legislation, and will be happy to return at some future date to give you an update of our experience in Minnesota. I will be glad to answer any questions, and thank you for your interest.

Statement of
Dr. Harry Mussman
Deputy Assistant Secretary
Science and Education
U.S. Department of Agriculture
Before the
Subcommittee on Water Resources
Committee on Public Works and Transportation
House of Representatives
April 25, 1990

Good morning Chairman Nowak and Members of the Subcommittee. I appreciate your invitation to join you this morning to discuss the U.S. Department of Agriculture's programs to protect and improve the quality of our nation's groundwater.

We at the Department recognize and accept the responsibility that agriculture must protect and conserve our natural resources.

Early in his Administration, President Bush announced his initiative to protect ground and surface water from contamination by fertilizers and pesticides through the coordinated activities of four Federal agencies, including the Department of Agriculture, relevant State and local agencies and farmers themselves. Congress responded affirmatively by approving most of the Administration's request for increased funding during FY 1990 to improve the quality of our nation's water supply. This past January 25, Secretary Yeutter appeared before the Senate Committee on Agriculture, Nutrition, and Forestry, and said, "Ultimate success of that initiative will be judged by the adoption of environmentally-sound management practices by farmers and ranchers."

Our initial effort will accelerate the development and adoption of these environmentally sound management practices through education and technical assistance, increased research, and data base support. USDA has developed a comprehensive water quality program plan to support the President's Initiative. We are in the process of implementing that plan.

The plan strives to: (1) determine the precise nature of the relationship between agricultural activities and groundwater quality; and (2) develop and induce the adoption of technically and economically effective agrichemical management and agricultural production strategies that protect the beneficial uses of ground and surface water.

I would like to share with the Subcommittee some of the details of USDA's activities. The research and education agencies of USDA have developed a comprehensive implementation strategy in support of our water quality program plan that has as its basic goal to provide an understanding of how current agricultural practices contribute to groundwater contamination and to seek alternatives to current crop production management systems that will reduce groundwater pollution by agriculture. The plan is currently being implemented across the country.

The education and technical assistance components of our effort will focus on transferring current research results to farmers, and providing both technical assistance and improved education programs in the field. These will accelerate voluntary adoption of improved management practices and systems.

Initially, our major research thrust emphasizes improved management practices in those Midwest areas where concentrated corn and soybean production involves widespread use of nitrogen and pesticides in connection with conservation tillage practices. This part of the research program has been closely coordinated with those of the U.S. Geological Survey (USGS) and the Environmental Protection Agency (EPA).

Other major research objectives are to continue work to determine the extent of agricultural contributions to non-point source pollution; determine how chemicals are released by or become excess to crop growth; improve the understanding of how agricultural chemicals move in soils and water; develop less costly ground water sampling techniques; and develop improved methods for storage, handling, mixing and cleanup of agricultural chemicals.

As research proceeds, education and technical assistance will represent an increasing share of the total initiative. Education and technical assistance programs are even now being escalated to encourage voluntary adoption of alternative management practices.

Demonstration projects have been selected and funded to encourage farmers to adopt newly developed conservation measures that more effectively manage agricultural uses of nutrients and pesticides. The first eight demonstration projects were announced earlier this year. Eight additional projects will be selected in each of the next two years.

Thirty-seven more hydrologic units were selected and announced earlier this year. Another 37 are planned for 1991. Increased technical and financial assistance will be targeted to regional programs that address multi-state water quality problems.

We believe these efforts will result in significant progress in addressing agriculture-related non-point source water quality problems.

The National Agricultural Library (NAL) has established a Water Quality Information Center to serve the information needs of scientists, educators, and the public. The Extension Service (ES) and the Soil Conservation Service (SCS) will continue to develop, implement and evaluate new management systems, and the Economic Research Service (ERS) and State Agricultural Experiment Stations (SAES) will consider the socio-economic impact of the new systems.

The Agricultural Stabilization and Conservation Service (ASCS) is also providing cost share funds towards 40 special water quality projects, a pilot program of integrated crop management projects in 41 states,the eight demonstration projects, and the 37 hydrologic areas.

All of the Department's programs are coordinated through the Secretary's Policy Coordinating Council's Working Group on Water Quality, which I chair. All of the agencies of the Department involved in water quality activities are represented on this policy-level working group.

The primary purpose of this group is to coordinate all Departmental water quality activities, including research, information, education, technical assistance, financial assistance, and regulatory aspects. Its oversight responsibilities include reviewing USDA water quality policies and programs to assure their effectiveness, appropriateness, and adequacy. It will also provide continuing advice and guidance to the Secretary and his staff on existing and emerging issues related to water quality -- with an emphasis on those which may have an impact on agriculture.

The work of the group is being accomplished through a very effective organizational structure: an Education and Technical Assistance Committee; a Research and Development Committee; a Data Base and Evaluation Committee; a Policy Advisory Committee; and a Public Affairs Water Quality Issue Management Team.

In addition, we proposed - and received unanimous agreement on - the setting up of an Interagency Coordinating Committee comprised of policy level representatives of EPA, USGS, and NOAA. This Committee will assure all agencies' actions are working toward a common goal.

This structure allows interaction among our USDA agencies in these specific subject areas, and provides the entire group with a solid overview of all activities.

The Working Group has initiated an in-house newsletter which is distributed to all key decision makers in the Department as well as to involved staff members. By now, each of the Members of Congress will have received the first in a series of Issue Bulletins devoted to water quality activities. Our intent is to publish and distribute followup bulletins every 2 to 3 months. Both of these publications are designed to keep people informed on the progress of the Departmental water quality activities toward achieving the objectives.

There is a new spirit of cooperation among Federal agencies. A number of interagency committees, including the Committee on Earth Sciences, are now focusing on environmental issues, including groundwater. To promote interagency cooperation we have set up the Interagency Coordinating Committee I mentioned earlier and our working group has met several times with EPA, NOAA, and USGS; we will continue to do so on a regular basis and are in the process of broadening the committee's scope by including the Tennessee Valley Authority and the U.S. Army Corps of Engineers.

Mr. Chairman, I would also like to point out that the Working Group on Water Quality is currently reviewing reports by EPA and by State agencies that give contamination levels for nutrients and pesticides found in farm wells. So far, we have gathered data from about 20 states that indicated varying degrees of contamination in farm wells in those states. The reports are still coming in and we are in the process of analyzing the data. These data and their analyses will provide us with a much better source of information regarding the contamination of groundwater.

Thank you and the Members of the Subcommittee for the opportunity to appear here today, and I welcome your questions.

TESTIMONY OF DR. DALLAS PECK
DIRECTOR, U.S. GEOLOGICAL SURVEY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES
OF THE
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

APRIL 25, 1990

Mr. Chairman and members of the Committee, it is a privilege for me to appear before you today to discuss the quality of our Nation's ground-water resources and to describe the activities of the U.S. Geological Survey (USGS) that are related to the protection and management of ground water. I am accompanied by Mr. Philip Cohen, who is Chief Hydrologist of our Water Resources Division. As you requested, Mr. Chairman, we have included in our testimony a discussion of our proposed National Water Quality Assessment Program. Because USGS water-resources investigations represent almost half the Federal ground-water science and technology effort, we have a keen interest in all aspects of ground-water quantity and quality problems.

Mr. Chairman, the President's Water Quality Initiative recognizes the importance of clean ground water to the health and welfare of the Nation and provides a focus for Federal interagency efforts to preserve and enhance water quality. A major component of this initiative addresses the relationship between agricultural production and nonpoint source ground-water contamination. As part of this initiative, we are assisting the farming community through the Department of Agriculture to reduce nonpoint pollution from agricultural activities. Similarly, we are working with the Environmental Protection Agency (EPA) and with State and local water management agencies to assist them in implementing State ground-water management and protection programs.

In my testimony this morning, I would like to address four topics: (1) what we know about ground-water quality; (2) USGS water-resources programs that contribute to our understanding of ground water; (3) the role of the National Water Quality Assessment program, and finally; (4) future program directions.

WHAT WE KNOW ABOUT GROUND-WATER QUALITY

Any assessment of the extent of ground-water contamination is difficult, owing to such factors as (1) limited access to ground water, primarily through existing wells and springs; (2) the potential for bias in existing data, because data often are collected to explore a particular water-quality problem; (3) incomplete information about the well, such as the well depth or identification of the aquifer from which the well draws its water; and (4) inconsistent methods of sampling and analysis. Although we know much about the quantity of ground water and the principles governing its flow through aquifers, our knowledge of the behavior of many contaminants in the subsurface generally is not complete enough to enable us to fully predict their fate and transport. We also are beginning to appreciate the close interaction between ground-water and surface-water resources and the potential for contaminants in one resource to affect the quality of the other. Data on many contaminants, such as pesticides, are lacking, and inventories of potential sources of contamination are incomplete. Despite these constraints, we have accumulated a considerable amount of information knowledge from past ground-water investigations and a number of assessments of ground-water problems have been made over the past few years. Based on USGS reports, and recent work of the U.S. Environmental Protection Agency (EPA), the Conservation Foundation, and the Office of Technology Assessment, we can draw a number of general conclusions about the status of ground-water quality in the United States. These include the following:

- The United States has large amounts of potable ground water available for use.

- Some contamination is the result of natural leaching of constituents from soils and aquifer materials. Common natural water-quality problems include concentrations of dissolved solids, sulfate, iron, and manganese which exceed secondary drinking-water standards. In some situations, natural concentrations of nitrate in western States exceed primary drinking-water standards.

- Locally, high concentrations of a variety of toxic metals, organic chemicals, and petroleum products form plumes around point sources such as leaking underground storage tanks, waste disposal sites, and landfills. Although the volume of contaminated water in such plumes is relatively small, potentially there are tens of thousands of such sites. The exact number of sites and their location is not known. These types of problems generally are concentrated in urban or industrialized areas, although they also are found in rural areas.

- Regions also have been identified in which contaminants, derived from nonpoint sources, are frequently present in shallow wells scattered throughout an area. Where detected, contaminant concentrations generally are at minimum detectable levels, although in a small percentage of water samples, contaminants, such as nitrate, exceed drinking-water standards or health advisories. Such nonpoint source contamination is associated with densely populated urban areas, agricultural lands, and concentrations of septic systems in suburban areas. Thus, shallow ground-water contamination can be related to land use.

- The shallowest aquifers generally are at greatest risk of contamination, especially those where the overlying unsaturated zone is thin and permeable.

- As yet, most deeper aquifers, which are commonly used for public drinking-water supplies, are relatively free from contamination.

- Contamination by nitrates and synthetic organic chemicals of shallow aquifers is widespread in many areas. For example, 20 percent of 124,000 wells analyzed over 25 years had a maximum nitrate-nitrogen concentration greater than 3 mg/L. Concentrations greater than 3 mg/L generally suggests the presence of nitrate from human activities related to fertilizer applications or septic systems. Six percent of the samples exceeded the Federal drinking-water standard of 10 mg/L.

- EPA has compiled reports on the occurrence of 46 pesticides in ground water; one or more pesticides have been detected in the ground water of 26 States that can be attributed to normal agricultural use. The most commonly detected pesticides are atrazine and aldicarb. (EPA currently is conducting its National

Pesticide Survey to provide a nationwide estimate of the occurrence of pesticides in drinking-water wells. Estimates of the percentage of wells contaminated will be available when the survey results are released in late 1990.)

Additional reports of contamination may be expected in the coming years as the intensity and scope of Federal, State, and local agency monitoring programs increase and as the sensitivity of our analytical procedures increase. It is likely that much of the contamination that is detected by these programs will be the result of past human activities and will be discovered because we are looking harder for it.

While we have much yet to learn about the sources and extent of contamination, some of the general principles and steps needed to protect ground water from future contamination are understood. Reductions of waste loads, control of contamination sources, especially in areas vulnerable to contamination, and improved land-management and agricultural practices can significantly reduce the risk of contamination in the future.

WATER RESOURCES PROGRAMS OF THE GEOLOGICAL SURVEY

The USGS has collected hydrologic data and conducted water-resources investigations and research since 1888. Until the early 1980's, most investigations focused on evaluating the quantity of water resources. For ground water, this involved determining the location, availability, and dependability of the supply and determining the response of ground-water flow systems to stresses caused by use of the resource. Increasing national concern about ground-water and surface-water quality and its effect on health and human welfare has caused the USGS to emphasize water-quality investigations during the last decade or so. This change of emphasis is reflected by the increase from about 50 USGS ground-water contamination investigations conducted in 1977, to 160 investigations in 1986, to more than 200 investigations now in progress.

These water-resources investigations are supported from three sources of funding: (1) annual congressional appropriations for the USGS Federal Program; (2) annual congressional appropriations which are equally matched by State or local funds to support USGS investigations in the Federal-State Cooperative Program; and (3) investigations supported by funds from other Federal agencies.

In the mid- to late-1970's, the Nation's concern about energy-related issues provided the driving force for much of the congressionally appropriated Federal Program. These issues involved coal, oil-shale, and nuclear-energy hydrology and underground heat storage.

Regional Aquifer-System Analysis (RASA) investigations were initiated in the late 1970's to provide information needed to develop and manage regional ground-water supplies because of concerns raised during the drought of the mid-1970's. The program determined the recharge-discharge characteristics of each aquifer system studied and developed computer simulation models that assist in understanding changes in the ground-water flow regime brought about by human activities such as pumpage or artificial recharge. To date 25 of a total of 28 regional studies have been completed or are underway. This effort is still one of the largest nationwide ground-water hydrology activities ever undertaken. All RASA investigations have water-quality components, although ground-water quality problems were not emphasized in the program.

Nuclear-Waste Hydrology studies, also initiated in the late 1970's, were one of the first USGS Federal Program activities with major water-quality implications. These studies investigated potential disposal sites for both low- and high-level nuclear wastes. The work was coordinated with the Department of Energy, the Nuclear Regulatory Commission, and the Environmental Protection Agency in support of their responsibility to manage civilian radioactive wastes.

Toxic-Substances Hydrology studies were initiated in the early 1980's to address problems associated with toxic waste in the Nation's ground water and surface water. The ground-water aspect of these activities involves study of the processes that affect the occurrence, transport, and fate of contaminants in the subsurface. The effort is divided into: (1) regional assessments to examine the hydrogeologic setting, climate, related human factors, and chemical characteristics of ground water; and (2) interdisciplinary research field studies of ground-water contamination by specific contaminants. The field studies have provided valuable information and understanding on the hydrogeology and biologic conditions of the study areas, and on the physical processes that affect flow of ground water and transport of solutes.

A recent initiative of this program is an investigation of the occurrence and distribution of agricultural chemicals in ground water underlying the corn and soybean producing areas in parts of eight midwestern States. This activity will provide an opportunity to assess the utility of knowledge gained from earlier site-specific investigations, laboratory research, and regional studies. A better understanding should emerge of the most important factors affecting transport and fate of agricultural chemicals over large areas. This activity and other similar investigations conducted in the Federal-State Cooperative Program are being closely coordinated with similar studies in the U.S. Department of Agriculture.

In 1986, National Irrigation Drainage studies were initiated of irrigation-induced contamination problems involving the Department of the Interior's management responsibilities. The initial studies address problems associated with the occurrence of high levels of selenium in irrigation drainage water at the Kesterson National Wildlife Refuge in the San Joaquin Valley of California.

The Department also wanted to determine if similar problems existed at other irrigation projects, at national wildlife refuges, or at other important wetland areas for which it has responsibility. Therefore, reconnaissance investigations were begun by USGS at nine locations in seven western States, conducted jointly with the Bureau of Reclamation and the Fish and Wildlife Service. Four of the original nine reconnaissance studies continue as detailed assessments. The initial reconnaissance studies are now complete, and currently, 11 additional studies are underway. Each study involves sampling of surface water, ground water, sediment, and biota for a large number of trace elements, pesticides, and radiochemicals.

In 1986, the USGS began pilot National Water-Quality Assessment (NAWQA) studies in four river basins and three ground-water systems (see attachment 1). These studies address the scientific approaches and methods needed to provide a nationally consistent set of data and information on water quality. I will describe the NAWQA program in greater detail later in my testimony.

More than 40 percent of the water-related activities of the USGS are supported by the Federal-State Cooperative Program, which has two components: (1) basic-data collection, and (2) interpretive and research studies. The current and historical information derived from the hydrologic data-collection component is essential to Federal, State, regional, and local agencies and to private and public organizations concerned with water-resources planning, development, management, and conservation. The USGS currently is conducting about 500 interpretive and research investigations this program.

Until about 10 years ago, most of the emphasis on water quality within the USGS was concentrated in the Federal-State Cooperative Program. Local problems concerning contamination at the local level were being investigated long before they emerged as problems of national importance. Prior to 1977, more than 600 such investigations had been completed. Obviously, methods of investigation, investigative tools, and contaminants of concern have changed drastically during the years and especially in the past decade; and these changes have affected how investigations are conducted.

The water-quality related activities in the Federal-State Cooperative Program have increased from about 35 percent of the total program in 1982 to more than 45 percent in 1988. Recent ground-water investigations have assisted State and local agencies' ground-water protection efforts by mapping aquifers and designing and operating water-quality networks.

The Other Federal Agencies Program accounts for about a quarter of USGS' funding for water-resources activities. This program has shown the largest percentage increase in funding since 1980 of the three major funding categories of USGS programs.

Ground-water activities conducted under this program are funded by the Departments of Energy, Defense, and EPA. In the late 1970's, the USGS began to assist the Department of Energy by investigating the proposed high-level radioactive waste site at Yucca Mountain, Nevada. By 1987, USGS activities in support of the Department of Defense's Installation Restoration Program also increased markedly. It is under this program that the Department of Defense addresses surface-water and ground-water contamination associated with hazardous waste. During the past several years the USGS has conducted a number of ground-water studies and evaluations to support EPA's ground-water strategy. Some ground-water work also is done for the Bureau of Reclamation and the Army Corps of Engineers.

NATIONAL WATER QUALITY ASSESSMENT PROGRAM

The National Water Quality Assessment (NAWQA) Program is part of the President's Fiscal Year 1991 budget now before the Congress. NAWQA is a response to the growing concern about the condition of the Nation's water resources. The program is a set of continuing multiyear water resources investigations of major river basins and aquifers (study units) whose information and data will enable (1) comparison of study units to characterize the resource nationwide and, over time, (2) detection of trends.

NAWQA has three main goals: (1) to obtain baseline information on water-quality conditions; (2) to identify trends in water quality; and (3) to describe natural and human factors that cause changes in water quality. We plan to meet these goals in a way that provides local, regional, and national scale information on what is happening to water quality. To do this requires a set of water-resources data that can be compared from place to place all over the country. Our data must be nationally consistent so that data collected from different study units can be combined and aggregated to address issues at different scales. And because we plan to detect trends over time, we are making a long-term commitment to the effort to assure our data are consistent and comparable over time.

NAWQA is designed to address a number of major issues or problems which will undoubtedly change over time. For example, our agenda for the initial study units of the proposed program will include:

- The occurrence of pesticides, such as atrazine and alachlor, in ground water and surface water.
- The relation of pesticide occurrence to application rates, cropping practices, and other factors.
- The relative magnitude of point and nonpoint sources of pollution.
- The effects of agricultural best management practices on water quality.
- Occurrence of trace elements and industrial organic compounds in surface water and ground water.

- The effects of municipal treatment practices on water quality.

A number of important planning, management, and regulatory issues rest on each of these information categories. These include the development of pesticide regulations, the choice of agricultural practices to encourage through Federal educational and demonstration programs, and the allocation of Federal and State funds to water-quality protection and mitigation efforts. In addition to these questions, others will be identified in consultation with other Federal agencies and with State and local agencies to assure that NAWQA is responsive to agency information needs.

To this end, we have incorporated a considerable amount of flexibility into the program. For example, intensive river reach investigations in each study unit will be selected to study specific issues or local problems of interest to water-resource agencies. Similarly, a program of targeted sampling will collect ground-water quality information on a specific suite of constituents in a geographic area of concern. NAWQA will provide numerous opportunities for interagency cooperation to meet critical needs at the Federal, State, and local levels of government.

The fully implemented NAWQA program will include 60 study units (see attachment 2). Each study unit will produce a number of information products in addition to the data bases and spatial data produced by the studies. Examples of such products include: quantitative descriptions of the occurrence and spatial distribution of a broad array of water-quality constituents; estimates of the quantity of contaminants entering various surface-water bodies and aquifers; information on the long-term trends in contaminant loads and constituents; and statistical relationships between water-quality characteristics and factors such as land use.

In addition, we plan a series of topical reports with a national perspective and, every 3 to 5 years, a summary report will be prepared to present statistics on the status and trends in water quality within the study units, together with regional and national summaries of key findings. We believe that the answers coming from these continuing studies will contribute to the solution of many local and regional water problems. The program represents a major step forward in enhancing our ability to measure and describe the quality of the water resources of the United States.

FUTURE PROGRAM DIRECTIONS

Much remains unknown about the Nation's ground water quality. The areas of greatest information deficiency and, accordingly, increasing areas of USGS future activity include three broad categories:

- Information about the distribution of chemicals in ground water, both in space and in time.

- Developing and adapting new laboratory and field methods for collecting and analyzing water samples for contaminants, especially organic compounds and trace metals. A major objective of such research is to lower the analytical costs of measurement.

- Investigations of the fate and transport of chemicals in ground water, including examination of the chemical and physical changes in the substances themselves and changes in aquifer properties as a result of interaction with the chemicals. Such information and understanding will lead to improvements in the computer models use to predict the movement and behavior of chemicals in ground water.

In addition to these topics which will strengthen the USGS technical capabilities in studying ground water, there are a set of broader issues which USGS programs, such as NAWQA and the Federal-State Cooperative Program, will assist EPA, the Department of Agriculture, the Bureau of Reclamation, the Corps of Engineers, and other agencies to address. These include:

- The relation of human health and aquatic health to the occurrence of organic compounds and pesticides in ground water and surface water.

- The relation of fertilizer and pesticide occurrence in ground water and surface water to application rates , cropping practices, and climate, geologic, and soil factors.

- The relation of a variety of land-use activities to ground-water quality .

- The relative magnitudes of point and nonpoint source contributions to ground-water and surface-water contamination.

The USGS also will increase assistance to States and local water management agencies with the acquisition and management of information about the distribution and characteristics of aquifers, ground-water use, and ground-water quality.

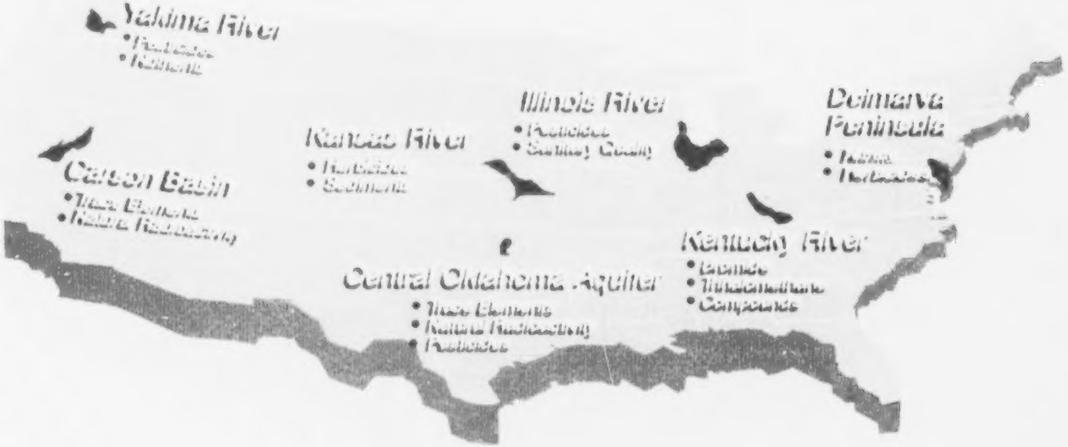
These and other types of information, understanding, and technical assistance are needed if we are to protect wellhead areas, designate safe potable water supplies, develop improved farming practices that will enhance water quality, and dispose of our society's wastes. The USGS is committed to making major contributions to the Nation's efforts to manage and protect the ground-water and surface-water resources of the United States.

Mr. Chairman, I would like to make one final observation which is related to Federal interagency coordination. A few weeks ago, the Department of the Interior sponsored a symposium for Federal agencies to introduce them to the concepts of the NAWQA Program. Secretary Lujan spoke of our common commitment to stewardship and fulfilling President Bush's goals for preserving and enhancing water quality. Over 100 Federal representatives attended, including a number of Assistant-Secretary rank officials from the major water agencies. A major topic throughout the symposium and resulting discussions was the question of how we can improve communications and coordination of our respective programs. Similarly, discussions with the Environmental Protection Agency and the Department of Agriculture on implementation and coordination of the President's Water Quality Initiative have brought together the same agencies and led to the establishment of a number of coordinating mechanisms which involve representation of both policy and technical personnel from the major water management and regulatory agencies. These efforts will enhance existing memoranda of understanding and coordinating committees Finally, my own experience with the Committee on Earth Sciences' Subcommittee on Ground Water suggests that major progress is and will be made over the next few years in getting water agencies with common interests and information needs to mutually support each others' programs and activities.

Mr. Chairman, this concludes my formal statement. Mr. Cohen and I will be glad to answer any questions that you or members of the Committee may have at this time.

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

KEY WATER-QUALITY ISSUES IN THE PILOT PROJECTS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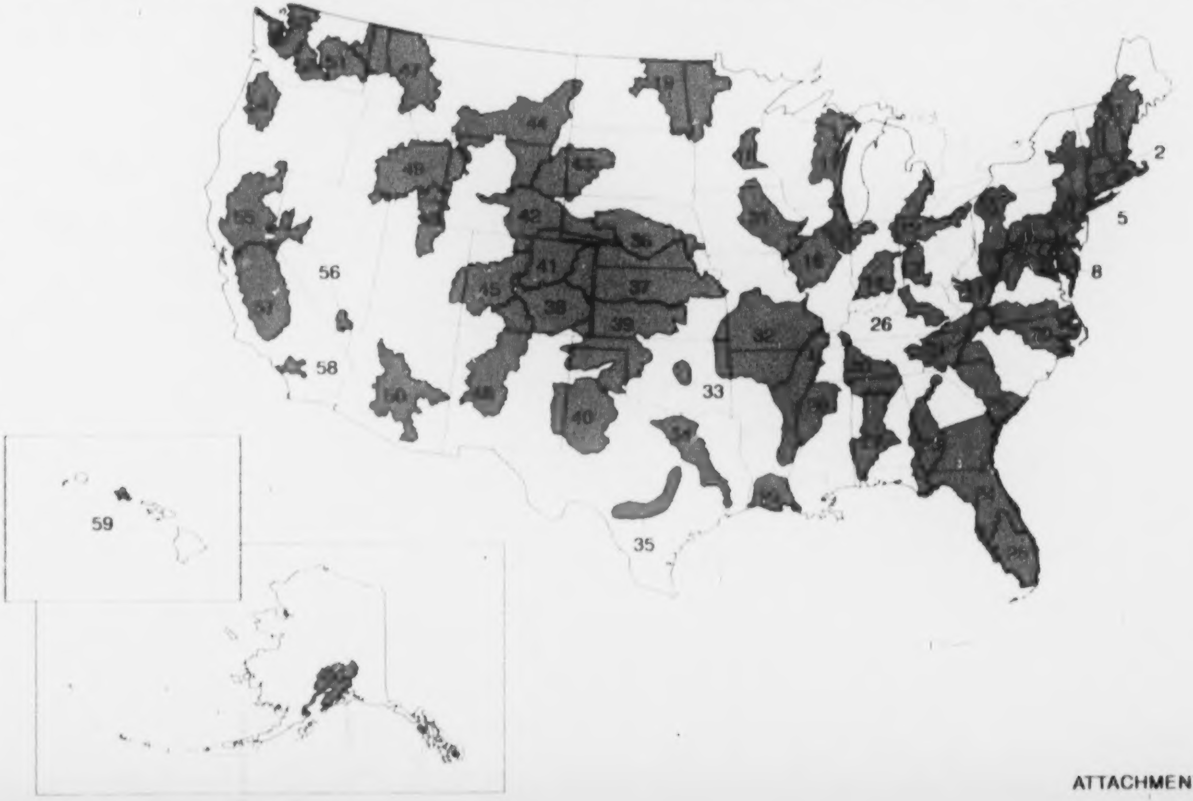
• Nutrients
Carson Basin
• Trace Elements
• Natural Radioactivity
Kansas River
• Herbicides
• Sediments
Illinois River
• Pesticides
• Sanitary Quality
Central Oklahoma Aquifer
• Trace Elements
• Natural Radioactivity
• Pesticides
Kentucky River
• Bromide
• Trihalomethane
• Compounds
Delmarva Peninsula
• Nitrate
• Herbicides

ATTACHMENT 1

Proposed Study Units for the National Water-Quality Assessment Program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ATTACHMENT 2

PROPOSED STUDY UNITS FOR A FULL-SCALE NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

UNIT NO.	STUDY UNIT NAME	STATE(S)
1	New Hampshire-Southern Maine Basins	ME, NH, MA
2	Southeastern New England	MA, RI
3	Connecticut Valley Drainage	NH, VT, MA, CT
4	Hudson Basin	NY, VT, MA, CT, NJ
5	Long Island	NY
6	Delaware Basin	NY, NJ, PA, DE
7	Lower Susquehanna Basin	PA, MD
8	Delmarva Peninsula	DE, MD, VA
9	Potomac Basin	WV, MD, VA
10	Allegheny and Monongahela Basins	NY, PA, WV
11	Kanawha Basin	WV, VA, NC
12	Lake Erie-Lake Saint Claire Drainage	MI, OH, IN
13	Great and Little Miami River Basins	OH
14	White River Basin	IN
15	Upper Illinois River Basin	IL, IN, WI
16	Lower Illinois River Basin	IL
17	Western Lake Michigan Drainage	WI, MI
18	Minneapolis-St. Paul Basin	MN
19	Red River of the North	MN, ND
20	Albemarle-Pamlico Drainage	NC, VA
21	Upper Tennessee River Basin	TN, NC, VA
22	Santee Basin and Coastal Drainage	SC, NC, GA
23	Apalachicola-Chattahoochee Basin	GA, FL, AL
24	Georgia-Florida Coastal Plain	FL, GA
25	Southern Florida	FL
26	Kentucky River Basin	KY
27	Mobile River and Tributaries	AL, MS
28	Mississippi Delta	MS, LA, AR, TN, KY, MO
29	Chicot-Evangeline	LA
30	Lower Tennessee River Basin	TN, AL, KY
31	Eastern Iowa Basins	IA, MN, IL
32	Ozark Plateau	MO, AR, OK, KS
33	Central Oklahoma	OK
34	Trinity River Basin	TX
35	Balcones Fault Zone	TX
36	Central Nebraska	NE
37	Kansas River Basin	KS, NE, CO
38	Upper Arkansas River Basin	CO
39	Central High Plains	KS, TX, OK, CO
40	Southern High Plains	TX, NM
41	South Platte Basin	CO, WY, NE
42	North Platte Basin	WY, CO, NE
43	Cheyenne and Belle Fourche Basins	SD, WY
44	Yellowstone Basin	MT, WY, ND
45	Upper Colorado Basin	CO, UT
46	Rio Grande Valley	NM, CO
47	Northern Rockies Intermontane Basins	MT, ID, WA
48	Great Salt Lake Basins	UT, ID, WY
49	Upper Snake River Basin	ID, WY, NV
50	Southern Arizona	AZ
51	Mid-Columbia Basin	WA
52	Yakima River Basin	WA
53	Puget Sound Drainages	WA
54	Willamette Basin	OR
55	Sacramento Basin	CA, OR
56	Western Great Basin	NV, CA
57	San Joaquin-Tulare	CA
58	Santa Ana Basin	CA
59	Oahu	HI
60	Cook Inlet Basin	AK

ROBERTA SAVAGE

Testimony of the Association of State and Interstate Water Pollution Control Administrators

Before The
House Subcommittee on Water Resources

SUBJECT: GROUND WATER

April 25, 1990

Mr. Chairman, Members of the Subcommittees:

My name is Roberta (Robbi) Savage, the Executive Director and the Secretary Treasurer of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). I am accompanied today by Linda Eichmiller, the Deputy Director of our organization.

ASIWPCA is the national, professional organization of State water administrators and interstate commissioners throughout this country. The membership is responsible for the daily implementation of State water programs including ground water program development and implementation. Among our ASIWPCA members, we have environmental and natural resource commissioners and heads of State agencies. This provides the Association with the breadth of experience and understanding to effectively relate ground water protection to other environmental programs including hazardous waste, solid waste, and pesticide management.

Mr. Chairman, as you are well aware, ground water is a major priority for the States. As has been documented many times before this and other Congressional Committees, States are on the cutting edge of ground water protection. ASIWPCA too has taken a leadership role in this area by providing technical exchange programs and assistance to its State members. To encourage statewide consistency, ASIWPCA has conducted policy and program discussions with other related State organizations including the National Governors' Association, the Association of State Drinking Water Administrators, the Association of State and Territorial Solid Waste Management Officials, the Interstate Conference on Water Problems and the Western States Water Council in an attempt to present a consistent and compatible State perspective.

BACKGROUND

The importance of an abundant supply of high quality ground water to the future of this Nation is widely recognized. In many areas of the United States, ground waters have been degraded as the result of human activities. We need to clean-up ground water that has been polluted and protect existing high quality ground water for current and future use.

The States have long recognized the vital importance of ground water, and are implementing programs designed to protect ground water quality, with remediation as necessary. Ground water is so highly variable with regard to quality, uses, and occurrence that it must be managed through State and Local programs tailored to protect against the specific threats that may exist in a particular community or State.

States regulate various pollution sources which threaten ground water quality or quantity. In addition to clean up activities, States report a number of preventive activities currently underway, including: permitting and surveillance of potential contamination sources; siting requirements for industrial and municipal waste-generating facilities; pesticide, fertilizer, and animal waste management; public education; and prohibition of certain activities, such as land disposal of toxic and hazardous waste. Many States have rigid requirements for deep drilling for oil, gas, and minerals as well as professional licensing and regulating of other well installation and construction.

Significantly, most States are now allocating and managing ground water quantity, because excessive pumping accelerates the development of conditions conducive to surface and ground water quality degradation. It cannot be over emphasized, however, that ground water allocation is solely a State responsibility.

ASIWPCA POSITION

Let me make it clear from the outset that the Association is not promoting national legislation. In fact, most States oppose national legislation until and unless the plethora of existing statutory requirements are fully examined and made consistent with any newly created legislation. However, in the event that national legislation is contemplated by this Committee, we feel that the State perspective can be of assistance in its drafting. We call to your attention, therefore, the following:

1. **States are actively involved and are taking the lead** in developing and implementing ground water monitoring, protection, and management programs.

2. **Ground water protection is, and must remain, a decentralized activity** -- managed and implemented at the State and local level.

3. **Federal requirements should not be prescriptive or detailed.** States must have flexibility to develop programs for their State specific needs.

4. **Congress must provide the means to resolve inconsistencies** which occur as a result of multiple Federal laws which directly or indirectly affect ground water.

5. **Federal funding to implement State programs will be minimized if** States are given maximum flexibility and minimal prescriptiveness in a national ground water quality protection program.

Let me be very specific, Mr. Chairman, as to what the States would view as essential to the enactment of Federal legislation.

I. National Goal

The goal should be to protect existing high quality ground water and to safeguard existing and projected beneficial uses. The quality of degraded ground water should be restored where feasible to support identified beneficial uses.

II. National Policy

1. Program:

States should continue to have the primary role in ground water management with respect to both quantity and quality. And, in accepting these responsibilities, States should continue to develop and implement comprehensive ground water clean-up and protection programs.

Any national legislation should address the comprehensive nature of groundwater and the plethora of existing Federal legislative mandates currently imposed on State and local governments. This does not mean, however, that Federal legislation should simply duplicate existing requirements. The national program, building upon State and Territorial programs, should:

A. Emphasize State prerogatives and authorities to manage and protect ground water quality.

B. Reinforce the sole jurisdiction of the States for the management of ground water quantity.

C. Identify specific components of an acceptable ground water quality program.

D. Provide States with maximum flexibility to set priorities and implement programs to resolve their specific ground water quality problems.

E. Apply equitably to the public and private sectors.

F. Create a "good neighbor" policy which requires all Federal agencies to conduct any activities which have the potential to negatively impact ground water quality, in accordance with the State's ground water protection program and State or Federal ground water regulations.

Mr. Chairman, ASIWPCA urges the Subcommittee to recognize that existing Federal laws and regulations do not address groundwater in a coordinated manner -- leading to numerous administrative and statutory inconsistencies. The plethora of complex statutory authorities currently governing the protection of our groundwater include the:

- * Clean Water Act,
- * Safe Drinking Water Act,
- * Resource Conservation and Recovery Act,
- * Comprehensive Environmental Response, Compensation, and Liability Act (Superfund),
- * Federal Insecticide, Fungicide, and Rodenticide Act,
- * Surface Mining Control and Reclamation Act,
- * Toxic Substances Control Act,
- * Atomic Energy Act,
- * Coastal Zone Management Act,
- * Federal Land Policy and Management Act,
- * Hazardous Liquid Pipeline Safely Act,
- * Hazardous Materials Transportation Act, and
- * Uranium Mill Tailings Radiation Control Act.

With this morass of requirements, it is not surprising that of States polled by ASIWPCA:

- * 68% believe that the inconsistencies or duplications **created problems** in groundwater protection, and

- * 95% agree that the Federal laws **should be changed to achieve better coordination and consistency** for groundwater.

2. **Regulations:**

No additional Federal regulations are required. States already have substantial ground water protection programs tailored to their specific needs. Highly prescriptive Federal laws and regulations already exist to protect ground water. It is sufficient for the Governor of each State to certify that their ground water protection programs comply with statutory principles.

3. Federal Actions:

Except in emergency situations, no Federal agency should take any action pertaining to ground water unless it first obtains, from the State in which the action will occur, a written certification that;

A. The action is consistent with the State program, and

B. The action will not duplicate regulatory or remedial action being pursued by the State.

III. State Role

States have appropriately taken the lead in developing and implementing ground water programs. States agree that responsibilities under national policy should include:

1. Criteria and Standards:

A. States should be responsible for promulgating criteria and/or standards appropriate to protect human health and the environment. States should be encouraged to use available USEPA health based data (e.g., dose response curves) as guidance.

B. State standards and/or criteria promulgated should be:

- The basis for potection levels for all ground water activities mandated under all Federal ground water related statutes, and
- The goal for cleanup levels for all Federal ground water related statutes -- where feasible.

2. Programs and Performance Standards:

A. State ground water programs should include:

- Monitoring of ground water quality.
- Assessment of ground water quality.
- Ground water quality standards and/or criteria.
- Management strategies, including programs for monitoring and reporting, classification, surveillance, enforcement, remediation, State technology exchange, and public education and involvement.

- Source controls (e.g., permits, compliance, enforcement, public education) addressing sources which cause significant ground water quality problems.

B. Permitting, compliance, enforcement, and nonpoint source activities needed to accomplish the requirements of Federal law should be the sole prerogative of the States.

IV. The Federal Role

ASIWPCA supports an integral Federal role:

1. USEPA Federal Lead:

USEPA should have lead responsibility for assuring coordination of, and cooperation among, all activities of Federal agencies which affect ground water.

2. USGS Coordination:

USGS should continue to conduct research and monitoring for ground water quality.

3. USDA Coordination:

USDA should continue to participate in programs related to ground water protection.

4. Federal Assistance:

In support of a fully implementable ground water program, related statutory programs (i.e., the Safe Drinking Water Act, the Clean Water Act, the Resource Conservation and Recovery Act, etc.) should be funded at adequate levels.

5. Research:

A. A greater priority needs to be placed on USEPA development and publication of public health based data for high priority contaminants. States need that information to conduct risk analysis.

B. USEPA should also conduct health effects research at a higher priority. States view research as a primary role of the Federal government including technical assistance, technology transfer, research/development, and information dissemination. Specifically, ASIWPCA members identified a variety of research needs and lead responsibilities:

Subject	***Lead Agency***
Aquifer Mapping:	*USGS (58%); States (38%).*
Development of New Computer Models:	*USGS (44%); USEPA (31%); States (11%).*
Development of Ground water Quality Standards:	*USEPA (50%); States (50%).*
Sampling Protocols:	USEPA (56%); USGS (20%); States (19%).
Behavior of Pollutants in Ground water:	USEPA (54%); USGS (17%); States (5%).
Development of Ground water Clean-Up Technologies:	USEPA (63%); States (11%); Industry (7%).
General Ground water Flow:	USGS (63%); States (29%).
Risk Assessment:	USEPA (57%); States (19%).
Pesticide Application Practices:	USEPA (51%); USDA (15%); States (25%).
Technology Transfer:	USEPA (57%); USGS (29%).

6. **BMPs:**

Federal agencies should develop best management practices (BMPS) for prevention and/or minimization of ground water quality impacts.

7. **Other:**

To assist the States with implementation of their programs, Federal agencies should:

a. Develop protocols for sample collection and analysis,

b. Provide training and technical transfer,

c. Maintain a national clearinghouse,

d. Survey ground water,

e. Enhance data management to promote standardization, and

f. Conduct research on ground water mitigation and remediation measures.

SUMMARY

On behalf of the Association, we extend our appreciation for your kind invitation to appear before this Subcommittee today. Let me reiterate that States are not calling on the Congress to pass Federal ground water legislation, but are willing to work with the Congress and the many Committees and Subcommittees interested in evaluating the need for such legislation. We look forward to having the opportunity to continue to work closely with you, Mr. Chairman, and the members of the Committee as you proceed to examine groundwater issues. And, in closing, Mr. Chairman, we would ask that a copy of a recent ASIWPCA report, America's Clean Water - The States' Nonpoint Source Assessment, the proceedings of the State Groundwater Technical Exchange Seminar, and our newest publication on the Clean Water Act be included as a part of the record.

Again, we appreciate your kind invitation to present the ASIWPCA testimony.

TESTIMONY OF
JAY J. VROOM
PRESIDENT
NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

BEFORE THE
UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
SUBCOMMITTEE ON WATER RESOURCES

APRIL 25, 1990

Mr. Chairman and Members of the Subcommittee, we appreciate this opportunity to appear before you today to address the impact of agricultural pesticides on ground water quality.

Reconciling the public's need for abundant and economical food with equally pressing environmental and conservation interests has become one of the most difficult challenges facing agriculture, particularly my industry. Ground water protection is an important part of this challenge. No one is more dependant on ground water than are farmers and ranchers, since more than 90% of rural families rely on ground water for drinking. With this in mind, our industry simply cannot allow pesticide use in agriculture to present unreasonable risk to our customers or the public through ground water contamination.

Agrichemicals are not a significant ground water contaminant. Most monitoring samples, even in areas of greatest potential for problems, do not reveal pesticides. Even when detected, pesticide levels usually are well within safe drinking water standards.

There is increasing evidence that pesticide contamination of ground water, where it exists, generally is not from routine field application, but from misapplication, spills or from other point source intrusions. This can be compounded by unique soil and water characteristics, improperly cased or cracked wells, or pesticide mixing and loading conducted too close to wells.

This difference between what we understand to be the facts and what is perceived, underscores the need for increased information, education and research. We need not only more information about pesticides and nutrients in ground water, but also what additional measures farmers and ranchers can take to use chemical technology responsibly or employ economical alternatives. We support the approach of various research and education bills currently before Congress, including Representative Stangeland's H.R. 4509.

In this respect, my industry supports efforts to enhance farm viability through economical use of off-farm inputs, including pesticides, and the use of other innovations in agricultural production. Much of this effort has been called "low input-sustainable agriculture". The term "low input" is not truly an accurate description for what is already standard agricultural practice. Farmers and ranchers currently monitor the cost, return and environmental effect of off-farm inputs.

Pesticides have helped to increase yields dramatically, improve agricultural economics and relieve farmers of much of the past drudgery and danger in agriculture. Agrichemicals are an essential part of the business of farming. Farmers and ranchers use these products because they result in higher productivity, greater safety, increased profits, and better environmental protection, particularly in the area of reduced soil siltation in our nation's streams. In conserving the quality of our ground water, it is essential that we retain the use of agricultural chemicals and reduce potential, unacceptable contamination.

In addition to more education and training, much can be done to address ground water quality by an improved partnership among federal, state and local governments. Ground water is unique in the local character of its hydrology, geology, surface conditions and existing land use. Contamination differs from place to place even within the same geographic area. For these reasons, programs need to be developed and administered primarily at the state and local level, with federal assistance, in order to cope with these unique factors.

In closing, I would like to emphasize that my industry is making a great effort to develop new products, formulations and applications that reduce the potential for ground water contamination. For example, several companies have developed products with higher biological activity that permit application rates to be lowered from pounds to ounces per acre. Already on the market are pesticides that are less persistent and which biodegrade rapidly in the soil. In development are improved application techniques, such as electronic spray devices, which will allow farmers to target pests at the point of infestation.

Thank you, Mr. Chairman and Members of the Subcommittee, for this opportunity to share with you what the agricultural chemicals industry is doing to protect the quality of America's ground water. We look forward to working with you and your staff to constructively address areas of mutual concern. I would be happy to respond to your questions.

STATEMENT OF
ROBERT H. WAYLAND
DEPUTY ASSISTANT ADMINISTRATOR FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES
OF THE
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
UNITED STATES HOUSE OF REPRESENTATIVES

April 25, 1990

Mr. Chairman and members of the Subcommittee, I am Robert H. Wayland, Deputy Assistant Administrator for Water of the U.S. Environmental Protection Agency (EPA). With me today is Marian Mlay, Director of EPA's Office of Ground-Water Protection and William L. Jordan, Chief, Policy and Special Projects Staff of the Office of Pesticide Programs.

I am very pleased to be given this opportunity to discuss with you one of our most important environmental concerns -- protection of our nation's ground-water resources. Among the many new initiatives started at EPA over the last year and a half is a Ground-Water Task Force chaired by Deputy Administrator F. Henry Habicht. The Task Force has developed a statement of principles clarifying the Agency's approach to ground water. As I will later discuss in greater detail, the goal of EPA's emerging ground-water policy is to prevent adverse effects to human health and the environment and to protect the environmental integrity of the nation's ground-water resources. Over the past several weeks we have been actively seeking the views of the States, private sector business and environmental organizations, and other Federal agencies with respect to the Task

Force's statement of principles and the State/Federal Options Paper which I discuss later in my testimony.

Some basic facts about ground water highlight its importance. About one-fourth of the fresh water used in this country comes from underground. Ground water currently supplies drinking water to 50% of the population, and 95% of those in rural areas. One-third of the water used for irrigation in this country is drawn from underground. The agricultural States of Arkansas, Colorado, Kansas, and Nebraska use over 90% of their ground-water withdrawals for agricultural activities. In addition, because ground water and surface water are often interconnected, ground water has long-term ecological significance in certain geological settings. Activities that protect ground water will also help to protect surface water in the longterm.

Protecting ground water is a complex endeavor. First, the concentrations of contaminants released to ground water often have very limited opportunity to be reduced through dilution or mixing with waters. Indeed, the adsorption of contaminants or transformation to different contaminants underground is difficult to assess accurately. Second, ground water is difficult to monitor. Taking a ground-water sample may require drilling a well and the information obtained from that sampling point may be significantly different from that collected a short distance away. Third, ground-water contamination is caused by a wide variety and number of sources, including improperly managed underground storage tanks and hazardous waste landfills, agricultural practices, septic tanks, and many others. From experience, we know that cleaning up ground water once contaminated is in most cases very expensive, and may be impractical.

Even with these challenges, the nation has made significant strides in the protection of ground water. EPA, the Department of Agriculture, the Department of the Interior, and other agencies have gained experience in implementing ground-water related authorities and undertaken new initiatives in this area. At the same time, because of the localized nature of ground-water problems and solutions, we recognize that the States need to have the lead responsibility on this issue. The States have been rapidly moving ahead in developing their own ground-water protection strategies and wellhead protection programs.

EPA ACTIVITIES TO PROTECT AND CLEAN UP GROUND WATER

EPA's new emphasis on pollution prevention is an effort is to move the country away from an exclusive focus on "end-of-the-pipe" reduction of pollution after it is generated, toward materials substitution, process changes, and other techniques to reduce the generation of pollutants initially. This emphasis will be expressed through changes in the way the Agency does business: by incorporating multi-media prevention-oriented approaches in our planning and budgeting systems, the development of regulations and policies, and more broadly raising the awareness of industry, local and State governments, grassroots organizations, academia, and the public to the environmental and other advantages of pollution prevention. These efforts have the potential to reduce significantly the amount of pollution that our society generates, which could ease the threat of ground-water contamination.

Since 1985, EPA has provided over $40 million for comprehensive development of ground water strategies by States and territories under the Clean Water Act. The strategies are an overall policy and planning framework to address legislative changes, ground-water classification, state regulatory development, resource assessment, ground-water data management, point and non-point source contaminant controls and public education. Guidance for development of strategies is provided by EPA drawing on reports from groups such as the National Ground-Water Policy Forum and the Urban Institute. In addition, EPA is expending $40 million this year under Section 319 of the Clean Water Act for grants to implement approved State nonpoint source management programs. Approximately $4 million was targeted for State ground-water protection activities.

Nearly thirty States have submitted for EPA approval state wellhead protection activities and EPA has already approved four State programs: Connecticut, Rhode Island, Texas, and Louisiana. The Wellhead Protection Program, established under the Safe Drinking Water Act, is EPA's program to comprehensively address resource protection for the public water systems based on ground water, which comprise approximately 90 percent of the total amount of ground water used for drinking in the United States.

AGRICULTURAL CHEMICALS

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA evaluates pesticides for ground-water contamination potential as well as toxicity. The Agency has undertaken an extensive and broad dialogue with affected governmental and private interests in formulating a strategy for addressing pesticides that are or may be present in ground water. The strategy will call for the specific use of EPA pesticide registration and reregistration authorities under FIFRA to prevent ground water contamination that would pose an unreasonable risk to human health or the environment. While the strategy calls for a continuing strong EPA role in addressing pesticides in ground water at the registration stage, it also emphasizes a key role for the States in the management of pesticide use. The strategy will incorporate Task Force Principles as its goal.

The Agency is also taking a number of actions to get better nationwide data on the occurrence of pesticides in ground water. First, EPA's National Pesticide Survey will determine both the frequency and level of pesticide and nitrate concentrations in domestic and community drinking water wells, and also will investigate how pesticide and nitrate concentrations in wells are associated with agricultural activities and ground water vulnerability near those wells. Second, EPA's Pesticides in Ground Water Data Base houses a collection of monitoring reports carried out over the past 10 years by pesticide registrants, universities, and government agencies.

Finally, EPA is working closely with other Federal agencies, with particular focus this year on working with USDA on two key Administration initiatives: the President's Water Quality Initiative and revisions to the 1990 Farm Bill. The President's Fiscal 1990 budget for the Water Quality Initiative allocates funding for coordinated Federal water quality programs. EPA's efforts are directed at building state capacities to address pesticide contamination of ground water.

HAZARDOUS AND SOLID WASTES, TANKS, AND HAZARDOUS SITES

Under the Resource Conservation and Recovery Act (RCRA), EPA regulates the management of hazardous waste in a manner protective of human health and the environment. RCRA ground-water protection regulations require all hazardous waste treatment and disposal units to regularly monitor ground water and to cleanup any releases of contaminants that may be detected from those units.

The Underground Storage Tank Program (UST) has established performance standards for the design, installation, and management of new underground storage tanks containing petroleum or hazardous substances, as well as requirements for upgrading existing tanks, release detection, corrective action, tank closure, and imposing financial responsibilities. This program is actively working with the States to focus on high priority issues, including the protection and cleanup of ground water.

Through the Superfund program, EPA has placed 1082 hazardous waste sites on the National Priorities List for cleanup, and proposed the inclusion of 136 additional sites. EPA has begun work on 83% of these listed sites, including making cleanup decisions at 478 sites. In addition, over 2200 actions have been taken to remove hazardous wastes from sites that posed an immediate threat to human health and the environment, ultimately preventing further contamination of ground water at many of these locations.

EPA GROUND-WATER TASK FORCE AND STATEMENT OF PRINCIPLES

Renewed interest in ground-water policy has made EPA face issues that were not completely addressed in the Agency's 1984 Ground-Water Protection Strategy. As I stated earlier, EPA has established a Ground-Water Task Force chaired by Deputy Administrator F. Henry Habicht and senior headquarters and Regional officials representing the many units within EPA whose responsibilities include ground-water protection. The Task Force has been meeting regularly to develop recommendations on a number of ground-water issues. The Task Force has developed a statement of principles and an options paper exploring state and federal roles in the comprehensive protection of ground water.

The Task Force is also developing recommendations on priority ground-water research and data collection needs and preparing strategies for how EPA, in conjunction with other Federal agencies and the States, can make data more widely available in a useful, coordinated way. Further, it is also strengthening the coordination of ground-water activities both within EPA and among other involved Federal agencies.

The overall goal in the statement of principles is to prevent adverse effects to human health and the environment and to protect the environmental integrity of the nation's ground water resources.

Three principles will form the basis for the Agency's ground-water pollution prevention actions:

o First, ground water should be protected to ensure that the nation's currently used and reasonably expected drinking water supplies, both public and private, do not present adverse health risks and are preserved for present and future generations;

o Second, ground water should also be protected to ensure that ground water that is closely linked hydrologically to surface water does not interfere with the attainment of surface water quality standards, and that valuable ecosystems are preserved for future generations;

o Third, ground-water protection should be achieved through a variety of means including pollution prevention programs aimed at eliminating and minimizing the amount of pollution that could potentially affect ground water, source controls, siting controls, the designation of wellhead protection areas, and protection of aquifer recharge areas.

With respect to remediation, and in keeping with the Agency's goal of prevention and given the costs and technical limitations associated with ground-water cleanup, we believe that ground-water remediation activities must be prioritized to first minimize human exposure to contamination risks, then to restore currently used and reasonably expected sources of drinking water and ground water that supports critical aquatic habitats, whenever such restorations are practicable and attainable.

Finally, to assure that both prevention and remediation activities are accomplished, an effective ground-water protection program must link Federal, State, and local activities into a coherent and coordinated plan of action.

EPA welcomes the views of Congress and other groups and individuals as we continue to formulate our ground-water policy. Task Force documents have been sent to congressional staffs, Governors, State government agencies, national organizations of State and local governments, local officials, national business and environmental organizations, and our sister Federal agencies. We have met with many of these groups to discuss their issues.

THE STATE/FEDERAL RELATIONSHIP IN GROUND-WATER PROTECTION AND RESTORATION

Recent State activities, confirmed in a report by the Urban Institute, demonstrate that States have a clear commitment to develop and implement comprehensive ground-water protection programs and currently have the ability to assume primary responsibility for ground-water protection actions. Thirty-seven States enacted ground-water protection legislation between 1985 and 1987, and many States have adopted further legislative initiatives in the past two years. Some of this legislation has been specific to underground storage tanks or problems with agricultural chemicals in ground water. Iowa and Minnesota, for example, have enacted broader approaches to protect the ground water resource. These legislative actions and others have resulted in the remarkable State progress in the development of ground water and wellhead protection programs.

The December, 1989 report of the Urban Institute illuminates the nature and content of current State strategies and programs.

The report was based on examination of forty State strategies developed between 1986 and 1988, and case studies of eight States. The report found that many programs are highly innovative and offer good models for ground-water protection. And the report found that there were no insurmountable technical or administrative problems blocking effective development and implementation of State strategies. However, the report did find major gaps in many State programs which have not yet been filled in primarily because of the newness and complexity of the strategies and because of the resource allocation decisions that States are making.

The Ground-Water Task Force, taking into account this report and other information, developed and released for comment a State/Federal Relationship Options Paper.

One major theme of the State/Federal Paper is that States and EPA recognize that much remains to be done at the Federal and State levels to ensure comprehensive protection of the ground-water as a resource. EPA, therefore, is committed to take a more strategic approach and more actively assist States in comprehensively protecting the resource. EPA will not increase its regulatory role, but will step up its efforts to build on the State level a framework for coordinating Federal programs, and for addressing unregulated sources of contamination.

As part of a more strategic approach, EPA is considering various policy options. For example, we are specifically considering defining with the States the elements of a State comprehensive protection program for such actions as: setting goals, characterizing the resource, developing and implementing control programs, defining the roles of governmental entities within the State and relationships to Federal programs. We are considering increased efforts to provide greater technical assistance to States through development of performance and/or technical standards or guidance to control certain types of sources of contamination. Also, we are considering providing for increased EPA oversight of State efforts using financial incentives or other non-regulatory approaches to encourage States to develop comprehensive ground-water protection programs.

The EPA Ground-Water Task Force will evaluate the comments reviewed on these documents and complete its work in June of this year. Implementing the chosen policy will then be pursued through a variety of means.

EPA COMMENTS ON H.R. 4509, "THE SUSTAINABLE AGRICULTURE AND CLEAN WATER ACT OF 1990"

I want to provide initial reactions to the section of the bill that would amend the Clean Water Act at Section 101 by adding a new national policy goal to control ground-water pollution.

While we recognize the importance of a national policy goal of preventing ground-water contamination, this amendment seems to imply that all the regulatory provisions of the Clean Water Act should apply to ground water. However, we do not believe the National Pollution Discharge Elimination System permitting program, the federal water quality criteria and ambient standards requirements, the effluent standards requirements, and federal water quality enforcement requirements are the appropriate mechanisms to realize protection of ground water.

The application of principles appropriate to surface water is not appropriate for ground water for three reasons. First, "Federalizing" decision making responsibility for individual sources is inappropriate because ground water decision making is highly localized due to the vast number and variety of sources of contamination. Second, EPA already has drinking water standards under SDWA and surface water standards under CWA which can guide decision making to protect and cleanup ground water. Third, a permit/effluent guideline approach would be both technically and administratively inappropriate for most ground-water sources as most sources of ground-water contamination that are not now regulated require local land use management as a major component of the control approach.

With respect to the sustainable agriculture provision in Title I of H.R. 4509, we defer to the USDA to present the Administration's views. We are sensitive, however, to the many objectives which the Farm Bill must achieve and that environmental protection is only one of these. We do believe that developing and demonstrating practical sustainable agriculture techniques that farmers can use holds great promise for protecting ground and surface water and assuring a safe food supply. We believe therefore that, as the Administration proposal recognizes, it is important to address this issue in the Farm Bill and commend the Ranking Minority Member for his efforts to highlight this important opportunity.

CONCLUSION

We look forward to working closely with this and other Committees of Congress with a strong interest in protecting ground water, as well as with other federal agencies, the States and the public to attain a broad consensus on the components of a national effort.

Mr. Chairman, I want to again thank you for inviting EPA to provide testimony on these critical issues of environmental policy. This concludes my testimony and I would be pleased to answer any questions from you and the Members of the Subcommittee.

ADDITIONS TO THE RECORD

Water Pollution Control Federation

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April 20, 1990

The Honorable Henry J. Nowak
Chairman, Subcommittee on Water Resources
House Public Works and Transportation Committee
B370A Rayburn House Office Bldg.
Washington, D.C. 20515

Dear Chairman Nowak:

The Water Pollution Control Federation respectfully submits the following statement for inclusion in the subcommittee's record of the April 25, 1990 hearing on groundwater. The statement outlines the Federation's position on the appropriate role for the Federal government in groundwater protection.

If we can provide any additional information or technical assistance on groundwater to subcommittee members or staff, please let us know.

Sincerely,

John A. Thorner

John A. Thorner
Director of Government Affairs
and General Counsel

cc: The Honorable Arlan Stangeland

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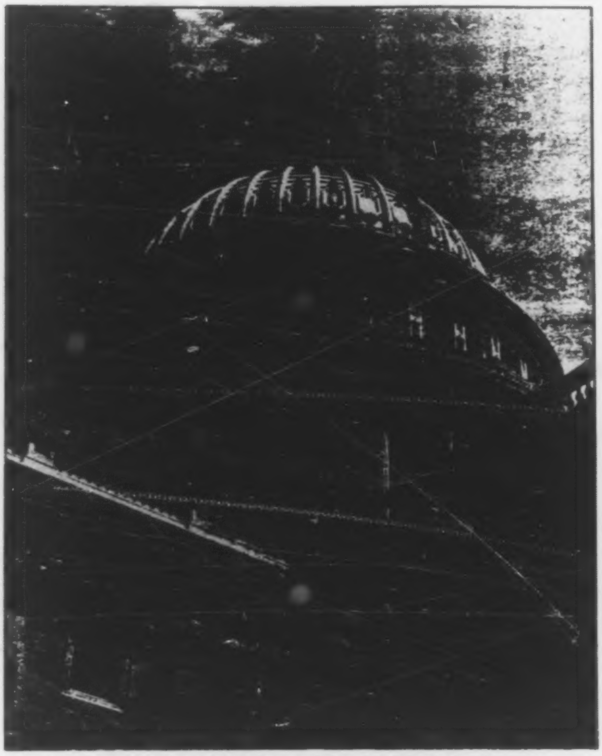
Federal role in groundwater legislation

Government Affairs Committee

Since the mid-1970s groundwater problems have been reported in every state with increased frequency. Groundwater is the primary source of drinking water for over 50% of the U.S. population, including 95% of rural households. It also provides 40% of the water used for agricultural irrigation.

Although much attention has been focused on contamination from abandoned hazardous waste disposal sites, there are many other threats to groundwater supplies, including landfills, septic systems, underground storage tanks, pesticides, brine disposal, abandoned mines, agricultural runoff, road salt, and salt water intrusion. Current federal clean-up and prevention efforts are narrow in scope, addressing specific causes and not the problem as a whole.

The Water Pollution Control Federation believes the most appropriate role the federal government should play at this time is one of technical support to states, most of which are attempting to deal with groundwater problems but lack reliable data and technology. Congress is currently considering legislation that identifies and centralizes responsibilities of various federal agencies that have jurisdiction (see box). The legislation would also provide additional funds for groundwater research. The following principles are intended to guide legislators as they review this legislation.



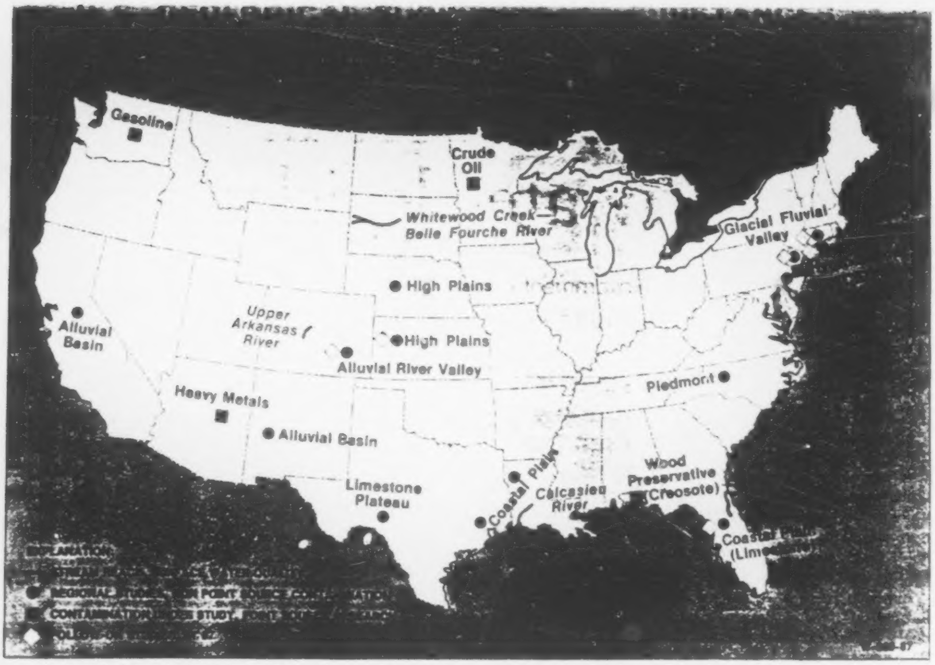
The states should look to Washington for technical support.

Groundwater research and projects.

Federal groundwater protection legislation should include increased support for groundwater research and demonstration projects. Government officials need sound, reliable scientific data as the basis for decisions about groundwater protection and cleanup programs. Technologies for groundwater protection and cleanup are still developing. The speed with which these technologies will develop depends on how and when research gaps are filled. We need to know more about existing groundwater quality, contaminant behavior, remediation processes, and preventative procedures. To help us better predict groundwater flow and contaminant behavior, emphasis should be placed on the development of enhanced pre-defined flow models.

Efficient use of new and existing research funds is as important as an increase. Funds should be awarded based on carefully drawn criteria and should be targeted to meet greatest research needs New funding should be made available to as many qualified researchers as possible.

Increased federal research and demonstration projects efforts should focus not only on cleaning up con-



Access to important research information can be made through a national groundwater database from which the states can formulate site-specific solutions.

taminated groundwater sources, but also on techniques and technologies that prevent groundwater contamination. Prevention makes economic as well as environmental sense, given the difficulties inherent in cleaning up a resource that can not be seen and is not well understood.

Information sharing, technology transfer, and training

Federal legislation should include increased support for information sharing, technology transfer, and training programs. The key words in federal groundwater legislation should be coordination and consolidation. The present lack of coordination of exisiting data is as much a barrier to groundwater protection as a lack of data itself. States should have a common, federal database from which to draw information as they develop solutions to local groundwater problems. Currently, there is no one federal source a state can approach for comprehensive data or technological methodology.

The Environmental Protection Agency (EPA) and the Interior and Agriculture Departments currently conduct groundwater research. Although significant sums have been spent—$30.5 million by EPA in Fiscal Year 1987 and $90 million by USGS in Fiscal Year 1986—the programs are "law-specific". They only serve the specific purposes mandated by each agency. Computerized data bases such as STORET, WATSTORE, and NAWDEX, are a step in the right direction, but need to be consolidated for universal application (see box).

If the federal government's role is to be the leader in groundwater research, it is only logical that it should also provide a central reservoir of data. The purpose of a centralized system would be two-fold: first, all states would have access to the latest technological and scientific data available, and second, needless duplication of research (and waste of federal, state and private dollars) would be avoided.

The importance of technology transfer can not be understated. A program to regularly distribute information to interested parties, such as that currently conducted by the EPA Center for Environmental Research in Cincinnati, Ohio, should be initiated.

Even when technology is available, a major impediment to protecting groundwater is the lack of qualified personnel. Water pollution control professionals have focused on surface waters for the last several decades. The shift to groundwater is in progress, but it takes many years to produce graduate level experts in fields such as hydrogeology. In this respect, there is a need for cross-disciplinary training to produce graduates who not only understand groundwater problems but who are also able to design solutions. In addition, training needs for existing personnel will increase as new technologies are developed.

Groundwater activity management

A single federal agency should have the lead role in coordinating groundwater research, demonstration, information sharing, and technology transfer programs at the federal level. Passage of major environmental laws in the past 20 years has given many different federal departments and agencies jurisdiction over groundwater. Historically, the U.S. Geological Survey (USGS), a service of the Department of Interior, has had jurisdiction over many areas of assessment of groundwater quantity and quality. The EPA now shares groundwater quality responsibilities with USGS, a responsibility that has developed in a piecemeal fashion, culminating in the creation of an EPA Office of Groundwater Protection in 1984.

The USGS and EPA are not the only

federal government agencies involved in groundwater quality and quantity research and assessment. The Department of Agriculture and the U.S. Army Corps of Engineers, have jurisdiction, as do two other sections of Department of Interior besides USGS—the Bureau of Mines and the Bureau of Reclamation. Lack of coordination among the various federal departments and agencies is an inefficient use of government resources, especially in light of high budget deficits and an increased need for comprehensive, rather than scattered, groundwater data. Federal legislation should authorize one agency or department to take the lead in coordinating all federal groundwater research and related activities.

Existing Authorities

Existing authorities of all federal agencies with groundwater research, assessment, or protection responsibilities should not be reduced by new federal legislation. As noted, significant research, assessment and protection efforts are already underway, much of it in support of or in response to specific statutory responsibilities. These efforts should not be disrupted or interrupted.

There should be no increase in the current regulatory authorities of any federal agency at this time. Currently six federal statutes grant the EPA limited regulatory authority for groundwater quality, and ten other statutes allow for protection of groundwater resources under specific circumstances, through various federal agencies. This myriad of federal laws is the primary reason why there should be no increase in regulatory authorities of any federal agency at this time.

Existing statutes focus on regulation of specific pollution activities as a cause of groundwater contamination and not on groundwater contamination itself. The Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), the Comprehensive Environmental Response, Compensation and Liability Act (Superfund), the Clean Water Act (CWA), the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA) all affect groundwater in that fashion. Other laws, such as the Hazardous Liquid Pipeline Safety Act, and the Uranium Mill Tailings Radiation Control Act, apply to groundwater only marginally.

Examination of the above federal laws reveals a decentralized approach to groundwater protection, but the fact remains that programs are already in place. Emphasis should be placed on coordination and consolidation of

Programs of protection are already in place. The regulatory maze should not be further complicated by the creation of additional statutory authorities.

The seven basic principles

Federal groundwater protection legislation should include increased support for groundwater research and demonstration projects.

Federal legislation should include increased support for information sharing, technology transfer, and training.

A single federal agency should have the lead role in coordinating groundwater research, demonstration, information sharing, and technology transfer programs at the federal level.

The existing authorities of all federal agencies with groundwater research assessment, or protection responsibilities should not be reduced by new federal legislation.

There should be no increase in the current regulatory authorities of any federal agency at this time.

Federal legislation should be designed to assist the states as they carry out their groundwater protection programs, but such legislation should not pre-empt or control those programs.

The federal agency with the lead role in coordinating such programs at the federal level should report to Congress on the programs made to improve our knowledge of groundwater phenomena, as well as the progress that states and other federal agencies are making in protecting and improving groundwater quality.

current activities, rather than on development of additional regulatory authority which could further complicate the maze which now exists.

Division of responsibility

Federal legislation should be designed to assist the states as they carry out their groundwater protection programs, but such legislation should not pre-empt or control those programs. Groundwater supply and quality problems are by their very nature local in scope. Differences in geology, land use, population density, water use, and waste disposal, among other factors, affect the extent to which groundwater is depleted or contaminated, or both. Most states are addressing the groundwater issue in varying ways. More importantly, however, most are making efforts to rectify those problems. Forty-eight states have or are developing comprehensive groundwater management plans and 33 have or are developing groundwater quality standards or use-classification systems.

Because the issue is site-specific, state, and not federal, government is best qualified to address it. However, there are common elements to all groundwater quality and quantity problems. Identification of those common elements and dissemination of that information through information sharing and technology transfer should be the primary role of the federal government.

Congressional Oversight

The federal agency with the lead role in coordinating such programs at the federal level should report to Congress on the progress made to improve our knowledge of groundwater phenomena, as well as the progress that states and other federal agencies are making in protecting and improving groundwater quality.

Passage of any legislation will not fix groundwater problems overnight. Therefore, given the importance of groundwater to the nation as a whole, Congress should continue to play a central role in groundwater policy after enactment of a law. Congress should exercise its oversight responsibility for any law that is passed, to assure that its mandates are being met. The department or agency assigned to coordinate federal activities should have the responsibility of regularly reporting to Congress. ■